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Revisiting a Forest Extension Strategy for British Columbia: A Survey of Natural Resource Practitioners and Information Providers

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BRITISH COLUMBIA
The Best Place on Earth

Ministry of Forests and Range
Forest Science Program
FORREX Forest Research Extension Partnership

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Shawn Morford and Chris Hollstedt

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ABSTRACT

Rapid and significant changes in British Columbia are greatly affecting the province's forest sector and are leading to an increased demand for reliable, science-based information. To help guide forestry extension programming in the province over the next 5 years, FORREX Forest Research Extension Partnership (FORREX) staff, in partnership with the Forest Investment Account – Forest Science Program, conducted a survey of clients, partners, and contacts. This web-based survey was designed to: (1) identify perceptions regarding the need for forestry extension in British Columbia; (2) characterize information gaps that exist within the forest sector; (3) identify barriers to the incorporation of new information; (4) evaluate information sources and forestry extension services; and (5) seek recommendations regarding the future of forestry extension.

In August 2005, a 26-question survey was e-mailed to 1368 potential respondents who were selected from the FORREX client database. Using a stratified random sampling method, respondents were chosen from nine groups (academia, consultants, federal government, provincial government, First Nations government, major licensees, municipal government, non-government organizations, and "other"). A response rate of 22% was achieved with this survey instrument; the calculated maximum error was 5.4% at a 95% confidence level.

All groups agreed that the need for extension services is greater now than it has been in the past 10 years. The greatest perceived barriers to incorporating science into management and decision-making were the lack of formal organizational processes, the profit focus of land managers, and the lack of time and funding to attend extension events. A majority indicated that extension should be paid by some ratio of public funds and cost recovery, although this ratio was not agreed upon. The operational community indicated a preference for accessible, concise information delivered in a timely fashion that does not require significant investments of time to absorb and incorporate.

Overall, this survey showed that there is no "one size fits all" approach for forestry extension services. A goal of future extension could best be described in the succinct words of one respondent, "Keep it relevant and bring the newfound information to the user quickly."

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Wellington Spetic, Natalia Vidal, and Rob Kozak (University of British Columbia, Faculty of Forestry, Department of Wood Science) conducted and wrote the exploratory cluster analysis.

Thank you to Nic Karlson at the Statistical Consulting Centre at the University of Victoria for statistical advice and coaching, and for graphics expertise. We would also like to recognize the clients and partners of FORREX and the Provincial Forest Extension Program for their generous contribution of time to complete the survey and provide insightful comments. We hope that the results accurately reflect the trends, patterns, and status of forestry extension needs in the province to help guide wise and strategic investments in extension programs and initiatives in the coming years.

Please note that funding assistance does not imply endorsement of any statements or information contained in this report.

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1 INTRODUCTION

In August and September 2005, FORREX Forest Research Extension Partnership (FORREX) staff, in partnership with the Forest Investment Account – Forest Science Program, conducted a web-based survey of clients, partners, and contacts to meet the following objectives.

- Identify perceptions regarding the level of need for forestry extension in British Columbia compared with 10 years ago.
- Characterize information gaps that currently exist within the forest sector.
- Identify barriers of preferred target audiences to incorporation of new information.
- Evaluate current information sources and forestry extension services.
- Seek recommendations regarding the future of forestry extension in British Columbia.

The survey was conducted in August and September 2005, via a web-based questionnaire e-mailed to 1368 potential respondents. The FORREX client database from which the sample was selected consists of historic client and partner contact information that has been accumulated and maintained over the past 7 years. We expected a 25% response rate and aimed for 342 returned surveys. Three-hundred and two (302) people, or 22%, submitted a survey, which was acceptably close to the target number of responses. The maximum (absolute) margin of error was 5.4% at 95% confidence.

2 METHODS

The FORREX client database was updated during the first 2 weeks of August to ensure that the survey population from which the sample would be drawn was as accurate as possible. Respondents were selected using a stratified random sampling design. Stratified sampling allows researchers to ensure that particular categories in the population are represented in the sample by stratifying the population according to categories or strata (Blaikie 2003). Samples were then allocated proportionally to each stratum. The client database contained 3463 individual e-mail addresses, from which 1368 were selected among 12 client groups or strata. A simple random selection method was used to select a sample from each stratum (Blaikie 2003). The survey was conducted using a commercial web-based survey tool called Zoomerang™ (MarketTools 2005). This tool allowed respondents to read, complete, and submit the survey on-line. The results could then be downloaded in a Microsoft Excel® file and transferred to SPSS®, the Statistical Package for Social Sciences (SPSS Inc. 2001) software, a standard tool for analyzing social survey data.

For this study, four strata in the FORREX client database (libraries, small business, woodlot licensees, minor licensees) were grouped together for the purposes of drawing the sample because these were too small to draw from individually.

The strata used to calculate sample size were:

1. Academia
2. Consultants
3. Federal Government
4. Provincial Government
5. First Nations Government
6. Major Licensees
7. Municipal Government
8. Non-government Organizations
9. Other

For most groups, we received just slightly fewer than the expected number of responses, except for federal government (10 more than expected responses), non-government organizations (10 fewer than expected), and First Nations (nine fewer than expected). Municipal government response rates are unknown since we did not track this particular classification as a survey question.

Provincial Forest Extension Program staff provided input on survey questions and reviewed early drafts of the questionnaire. A Steering Committee from the Forest Science Program's Extension Program Advisory Committee also provided input for the questionnaire. The sample was drawn from the client database, and an initial invitation letter was sent by FORREX Chief Executive Officer on Wednesday, August 24, 2005, to all potential respondents. The survey was launched on August 26 and an invitation sent by e-mail. A reminder e-mail was sent on September 2.

The survey (Appendix 1) included closed and open-ended questions relating to respondent characteristics, opinions regarding key target audiences for extension, importance of extension services, usefulness of current extension products and services, and highest-priority topics for extension in the future (Appendices 2–6). Additional written comments from respondents are compiled in Appendix 7. Analysis of survey responses included descriptive statistics such as percentage of respondents and means. To detect natural groupings of respondents, the data were also subjected to an exploratory cluster analysis (Appendix 8).

2.1 Limitations and Assumptions

The survey sample was drawn from a population that included contacts who were in the FORREX database with current e-mail addresses. This excluded current, potential, or future clientele and partners who may be relevant, but who were either not included in the database or were in the database without current e-mail addresses.

One survey question invited respondents to indicate their professional affiliation. Some respondents chose not to specify their affiliation, so 2% of the respondents are classified as "unspecified" and were not included in some of the analyses that compared responses across respondent groups. As an oversight, no category was included for those who considered themselves community or municipal government. While municipal government can be considered as a target for FORREX and the provincial forest extension program, responses from this group cannot be distinguished in the analysis.

The survey does not include data on non-respondents to determine the level of non-response error; it is not known if there are differences in characteristics between those who responded to the survey and those who did not.

Some survey questions included choices that were analyzed using percent-

ages of respondents choosing a particular answer, and as choices on a numbered continuum (e.g., "huge barrier" = 1, "not a barrier" = 4) from which means were calculated. Our analysis shows that conclusions derived from presenting the data as percentages were generally consistent with the conclusions of the data presented using means. Percentages were calculated for respondents who answered a given survey question.

Estimates of percentages and means assume that the sampling design is self-weighting, which is not exactly the case since the allocation of samples ended up not being perfectly proportional. The implication is that estimators will carry some unknown bias, albeit small.

3 RESULTS

3.1 Profile of Respondents

Respondents were asked to select from a list of 26 categories that described affiliation. For the purpose of the analysis, the 26 categories were consolidated into seven respondent groups that are used in the data presentation throughout the report (Table 1). An eighth group, which we called "unspecified," included seven respondents who chose not to identify their affiliation.

TABLE 1 *Respondent groups used in the analysis of the FORREX client survey*

Groups used for analysis	Affiliation	Number of respondents in group
1. Industry	1. Major licensees 2. Minor licensees 3. Woodlot licensees 4. Grazing licensees 5. Private consultants–operations	76
2. Government operations	6. Victoria-based provincial operations 7. Non-Victoria provincial operations 8. Federal operations	71
3. Research: non-government and university/college (RNGUC)	9. University/college research 10. Teaching 11. Administration 12. Extension 13. Education or research organization 14. Private consultants – research	47
4. Research: government	15. Non-Victoria provincial government 16. Victoria government provincial research 17. Federal research	29
5. Policy	18. Provincial Victoria policy 19. Non-Victoria policy 20. Federal policy	31
6. NGOs and policy consultants	21. Private consultants–policy 22. Conservation organizations 23. Industry associations	28
7. First Nations–affiliated organizations	24. First Nations learning institutions 25. Tribal council employees/contractors 26. Other First Nations	13

3.1.1 Location of respondents Respondents were asked to identify the region where they work most of the time. Twelve percent of respondents were Victoria-based, 18% were from the province's Northern Interior, 33% were from the Southern Interior, and 25% were from the coastal southwest outside of Victoria. Fourteen respondents did not indicate their region. Figure 1 shows the number and percent of respondents by respondent group.

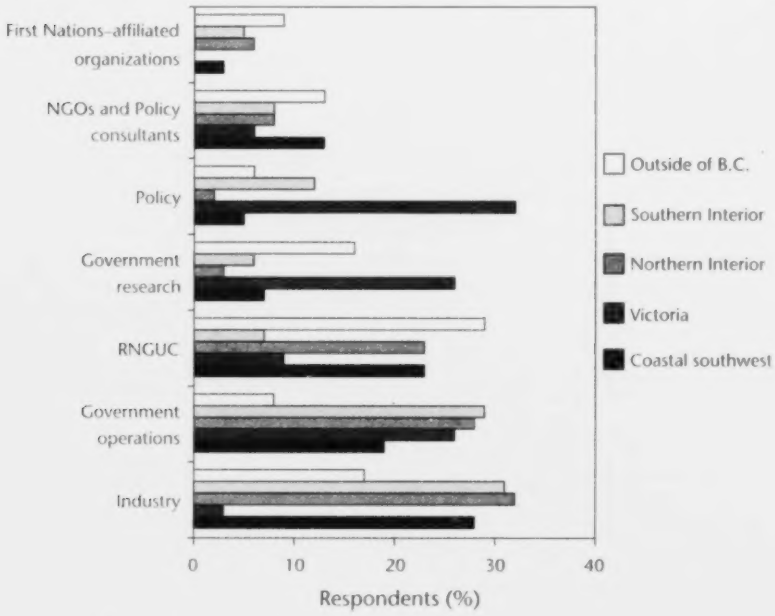

FIGURE 1 *Respondent groups by region.*

3.1.2 Age of respondents Respondents were asked to select from a set of four categories to identify their age. A majority of the industry and government operations respondents was between 46 and 55 years old (Figure 2). Respondents in the category "research: non-government and university/college" (RNGUC) had the highest number of younger respondents (35 years old and younger). The highest number of 46- to 55-year-olds were from the government operations, policy, and non-government organization (NGO) and policy consultant groups.

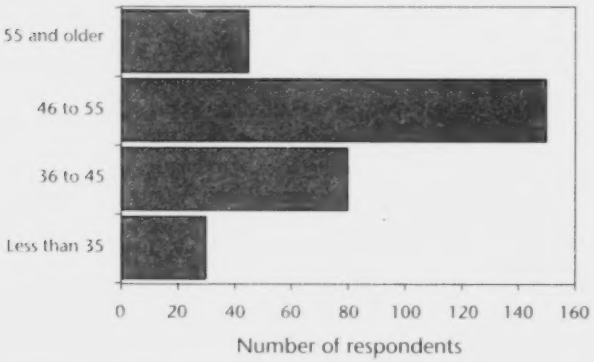

FIGURE 2 *Age of respondents.*

3.1.3 Percentage of time as provider of information to others To distinguish between information providers and information users, respondents were asked to select from four categories to indicate the percentage of time they spent as a provider of information to others in their jobs. Over one-half of the respondents said they spent 1–25% of their time as information providers, a third said they spent between 26% and 75%, and one-tenth spent more than 75% of their time (Figure 3) in this way. Over three-quarters of the industry respondents considered themselves as information providers 1–25% of the time. Nine of the 13 First Nations–affiliated respondents indicated that they were information providers 1–25% of the time.

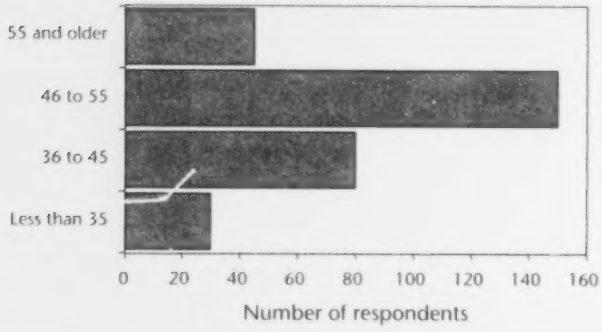

FIGURE 3 *Percentage of time spent by respondents as information providers.*

3.2 Importance of Extension

Most respondents believed that the need for forestry extension services in British Columbia is more important than it was 10 years ago. Sixty-four percent said it is "much more important" or "somewhat more important" and 31% said it is "equally as important." Eighty-five percent of First Nations–affiliated respondents, 76% of RNGUC respondents, 71% of policy respondents, and 60% of industry respondents felt that it is more important than 10 years ago. No more than 7% of any group felt that it was less important than 10 years ago. Some of the reasons cited in the comments section by respondents for the increasing need were: certification processes; the mountain pine beetle epidemic; changes in forest policy and legislation; inclusion of First Nations in land management; competition among licensees to "deliver lower and lower cost wood"; the existence of community forests; and the lack of time or resources for managers to conduct literature searches, read journals and lengthy reports, or perform Internet searches.

Over 50% of the respondents across all respondent groups agreed with the statement that the increasing presence of forest certification processes had increased the need for provincial extension services. Sixteen percent of First Nations–affiliated respondents and 59% of government researchers agreed that certification has led to increased need for extension. Seventy-nine percent of respondents agreed that the requirements for management strategies that incorporate social, economic, and ecological factors have increased the need for extension services in the province.

Compared to respondents in other areas, fewer respondents from outside of British Columbia and from Victoria felt strongly that the need for extension services was higher than 10 years ago. Respondents in southwest British Columbia and the Southern Interior were comparable in terms their perceptions, followed closely by the Northern Interior.

3.3 Preferred Target for Extension Services

Respondents were asked who they think should be the primary target audiences for forestry extension services in British Columbia over the next 5 years. Respondents were asked to rate the importance of 12 types of target audiences by selecting from a range of "most important" to "least important" for each audience type. Sixty-six percent of respondents agreed that forest and range licensees were a most important primary target audience for forestry extension services. Forty-nine percent of respondents thought that First Nations and other Aboriginal organizations or governments were a most important audience. Forty-eight percent thought that consulting forestry practitioners were most important, while 44% said that provincial and (or) federal government (44%) were a most important audience. Figure 4 shows the percentage of respondents who selected a given target audience as "most important."

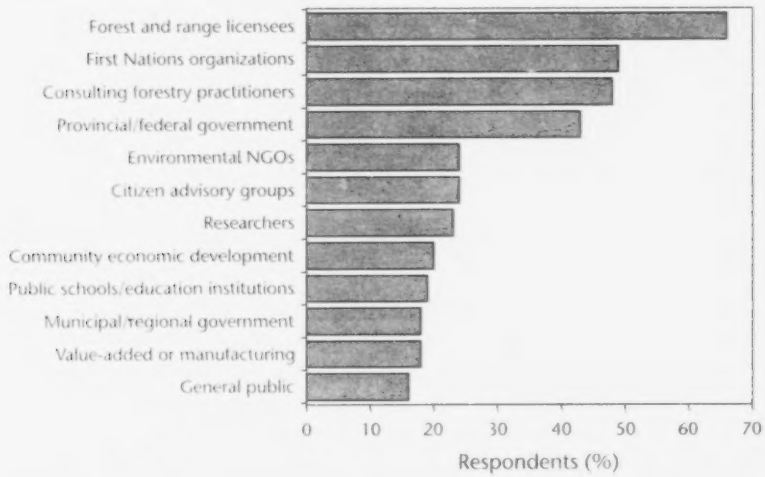

FIGURE 4 *Percentage of respondents who selected particular target audience as "most important."*

Provincial government was considered as a "somewhat important" target audience for extension by one-third to one-half of respondents of all respondent groups; a higher number of non-government and RNGUC respondents selected provincial government as most important (45%) than did other respondent groups. Respondents were more polarized in regards to community economic development (CED) organizations as a target audience—NGO and RNGUC respondents either indicated that CED organizations were somewhat or most important, while most other respondents indicated that they were somewhat to least important.

Environmental organizations, municipal or regional governments, public advisory committees, public schools, and the public were least important as the primary target groups for extension. Researchers were considered less important by a higher percentage of respondents overall (32% selected "least important"). This does not imply that respondents believed that any target audience was not important, just less important than other groups.

3.4 Barriers to Incorporation of Science in Operations, Policy, and Planning

Respondents were asked to select potential barriers to the application of science and experiential knowledge in forestry policy, planning, and operations in British Columbia. The largest percentage of respondents selected "amount of time available to incorporate innovations into planning and operations" (36%), followed by "formal processes for incorporating new information into planning, operations, and policy" (30%) and "corporate focus on profit-related goals" (30%) as a "huge barrier." The opinions about "quality of extension services" as a barrier were mixed: 49% of respondents indicated it was a "moderate" or "huge barrier," and 47% indicated it was a "slight barrier" or "not a barrier" (Table 2; Figure 5).

TABLE 2 *Percentage of survey question 4 respondents who consider item as huge or moderate barrier to application of science and experiential knowledge in forestry policy, planning, and operations.*

Potential barrier	Respondents who consider barrier "huge" (%)	Respondents who consider barrier "moderate" (%)
Amount of time available to incorporate innovations into planning and operations	36	40
Corporate focus on profit-related goals	30	35
Formal processes for incorporating new information into planning, operations, and policy	30	38
Government policy incentives for companies to be innovative	24	29
Amount of funding to attend extension workshops and other events	21	46
Level of trust in information sources	17	37
Perceived risk of innovations	17	36
Institutional or corporate culture regarding how employees are rewarded	15	32
Quality of extension services available	11	38

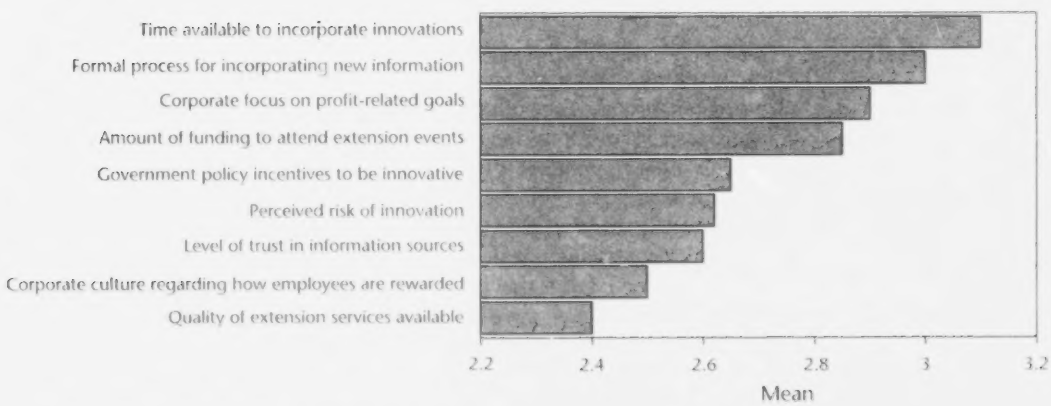

FIGURE 5 *Mean responses regarding potential barriers to application of science and experiential knowledge (1 = not a barrier and 4 = huge barrier; note: to standardize responses for the purpose of this analysis the original questionnaire ranking was reversed to calculate means).*

We compared the responses of individual respondent groups with the aggregated data for all respondent groups to see whether any differences existed. Between 21% and 26% of industry, research, First Nations–affiliated, and policy respondents indicated that the "formal processes for incorporating information" was a "huge barrier," whereas 40–42% of respondents in the other groups selected this option. Just over 50% of RNGUC respondents and 46% of First Nations–affiliated respondents selected "corporate focus on profit goals" as a "huge barrier," whereas from 16% to 37% of other respondent groups selected this option. A high percentage across all respondent groups indicated funding as a "moderate barrier," although about 18% of NGO and 33% RNGUC respondents indicated that it was a "huge barrier" compared with only 7% of respondents in the policy group. No more than 10% of any respondent group selected funding as "not a barrier."

About 33% of NGO–policy consultants, RNGUC, and policy respondents indicated that "government incentives for companies to be innovative" was "not a barrier." However, a notable difference in perception was evident between the NGO–policy consultants and the RNGUC respondents on the one hand (over 40% of each group indicated that government incentives were a "huge barrier"), and government researchers and policy respondents on the other (32% of each group indicated that government incentives were "not a barrier"). This shows that considerable disagreement existed across respondent groups relating to the role of government incentives serving as a barrier to innovation.

Sixty percent of policy respondents indicated that "amount of time available to incorporate innovations into planning and operations" was a "huge barrier"; responses from other groups ranged from 16% (First Nations–affiliated) to 44% (NGO–policy consultants). Perceptions concerning "institutional or corporate culture regarding how employees are rewarded" also varied among respondent groups: 30% of industry and only 7% of NGO–policy consultants selected this as "not a barrier." Only 6% of respondents in the government operations group selected this as a "huge barrier." Disagreement was also evident among groups concerning the "quality of extension services available." About 33% of the NGO–policy consultant respondents indicated that this was a "huge barrier," whereas 33% of government researchers indicated that this was "not a barrier."

Overall, First Nations respondents rated each potential barrier higher than did other groups. Government operations and First Nations–affiliated respondents rated "formal processes for incorporating new information into planning, operations, and policy" as more of a barrier than did other respondent groups. For policy respondents, "amount of time available to incorporate innovations into planning and operations" was less of a barrier than for other respondent groups. For government operations respondents, "amount of funding to attend extension workshops and other events" was a greater barrier than for government policy or government research respondents.

To calculate means, a scale of 1–4 is used ("1" = "not a barrier"; "4" = a "huge barrier"). (Note that these numbers have been reversed from the survey to avoid a low mean as a high score.) For five respondent groups (industry, government operations, RNGUC, and policy), means ranged from 1.6 (for the policy group regarding amount of time available) to 2.9 (for the government researchers group regarding quality of extension services) (Figure 6). Figure 6 shows that the greatest variation in means was in perceptions surrounding "government policy incentives for companies to be innovative" and the "institutional or corporate culture regarding how employees are

rewarded." Across respondent groups, much more agreement was evident in perceptions surrounding "amount of funding to attend extension workshops and other events" and "amount of time available to incorporate innovations *into planning and operations*" as potential barriers to the application of science and experiential knowledge in forestry policy, planning, and operations.

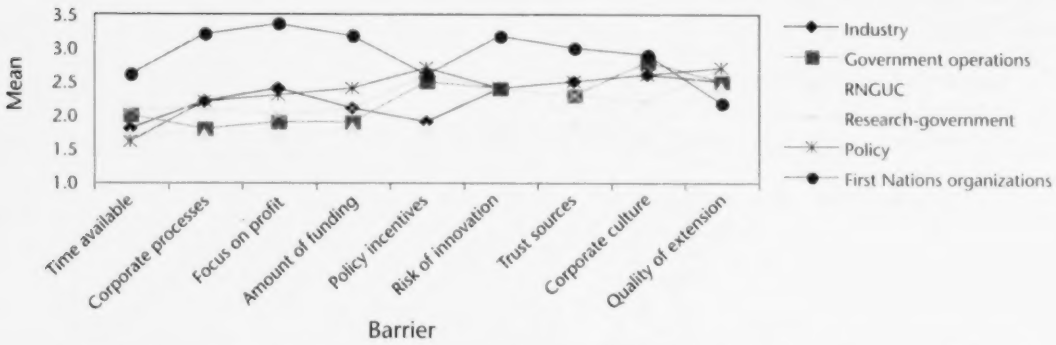

FIGURE 6 *Mean responses, by respondent group, regarding barriers to incorporation of knowledge in operations, planning, and policy (1 = not a barrier and 4 = huge barrier; note: to standardize responses for the purpose of this analysis, the original questionnaire ranking was reversed to calculate means).*

3.4.1 Ability to access and apply new science-based information Fifty-one percent of respondents across all groups agreed or strongly agreed with the statement "it's often hard to figure out who the knowledgeable person is on a topic." This was especially true for First Nations–affiliated respondents, and to a lesser degree for respondents in the NGO–policy consultant and government operations groups. The statement "knowing experts personally is key to my likelihood of adopting innovations" received strong agreement across groups (40% agreed and 16% strongly agreed).

Thirty-nine percent of respondents across all groups agreed or strongly agreed with the statement "it's difficult to incorporate new research, as it seldom seems to apply to my situation." In addition, 74% of respondents agreed or strongly agreed with the statement "trusting the researcher is a major factor for me in deciding to incorporate their research into my work." Fewer respondents (35%) agreed that "I am more likely to use research results produced within my organization than produced by external sources."

3.5 High-priority Topics for Extension

From a given list of topics, respondents were asked to select those that they felt were the highest priority for forestry extension in British Columbia. They were also given the opportunity to suggest other topics, and many respondents chose to do this. A complete set of topics offered by respondents is presented in Appendices 2–6. Respondents were not asked to choose between lists of topics or to rank the priority of topics.

3.5.1 Ecosystem-based management and biodiversity Respondents were given a list of eight topics related to biodiversity and asked to select the ones they considered as the "highest priority" for forestry extension. More than half of respondents (54%) said that "assessing, managing, monitoring, and evaluating biodiversity" was a highest-priority topic compared with 56% of respondents who did not select it as a high-priority topic. Forty-two percent selected "habitat requirements for species at risk as a highest-priority topic."

Forty-one percent selected "natural disturbance patterns and implications for forest management and restoration" as a high-priority topic. Less frequently, respondents selected "improved inventories for ecological values," "contribution of protected areas and non-harvestable land base to maintenance of biodiversity," "invasive species," "techniques and requirements for ecological restoration," and "impacts of range management on biodiversity" (Figure 7). Commonly mentioned "write-in" topics were related to forest health, species at risk, access management, effects of climate change, and sustainability issues such as sustainability of retention harvesting and silviculture (Appendix 2).

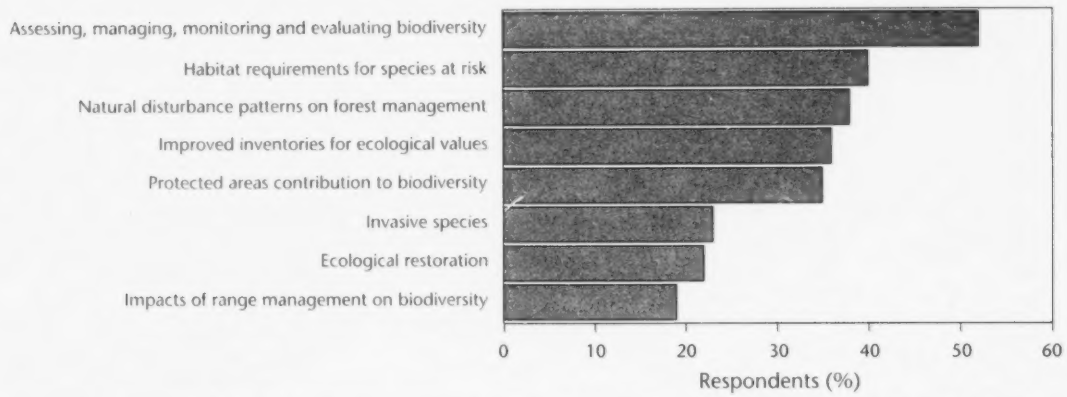

FIGURE 7 *Percentage of respondents who considered ecosystem-based management and biodiversity topics as highest priority for forestry extension.*

3.5.2 Socio-economics Respondents were given a list of four topics related to socio-economics and asked to select the ones that they considered the "highest priority" for forestry extension. "Valuing non-timber resources for inclusion in operations, planning, and policy" was ranked by 62% of respondents as highest socio-economics–related priority for forestry extension. "Incorporating social and economic indicators into planning, operations, and policy" also rated highly (55%). "Social values and trends" (34%) and "public participation processes" (27%) were selected less frequently (Figure 8). A large number of write-in responses included information about and for forest-based communities: value-added community-based forestry, maintaining resiliency, and small businesses. Opportunities for communities and community-based forestry, and valuation of ecosystem services supplied by forests were mentioned by several respondents. Several people mentioned a number of topics related to First Nations, and three mentioned topics related to recreational uses of public land (Appendix 3).

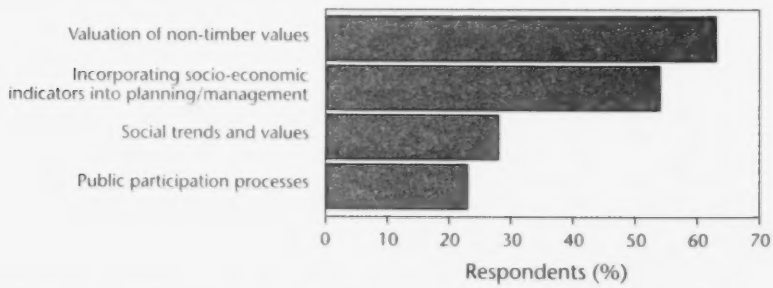

FIGURE 8 *Percentage of respondents who considered socio-economic topics as highest priority for forestry extension.*

3.5.3 Watershed processes and management Respondents were given a list of eight topics related to watershed processes and management and asked to select ones they considered the "highest priority" for forestry extension. "Forest management impacts on water quality or quantity" was the most frequently selected as the highest-priority watershed topic for forestry extension (56% of respondents), followed by "riparian management" (43%), "hydrologic recovery and silviculture systems," and "range management impacts on water quality and quantity." "Forest engineering (e.g., roads and stream crossings)," "stream geomorphology," and "hillslope geomorphology and soils" were selected less frequently (Figure 9). Climate change and mountain pine beetle were written in as high-priority topics by several respondents (Appendix 4).

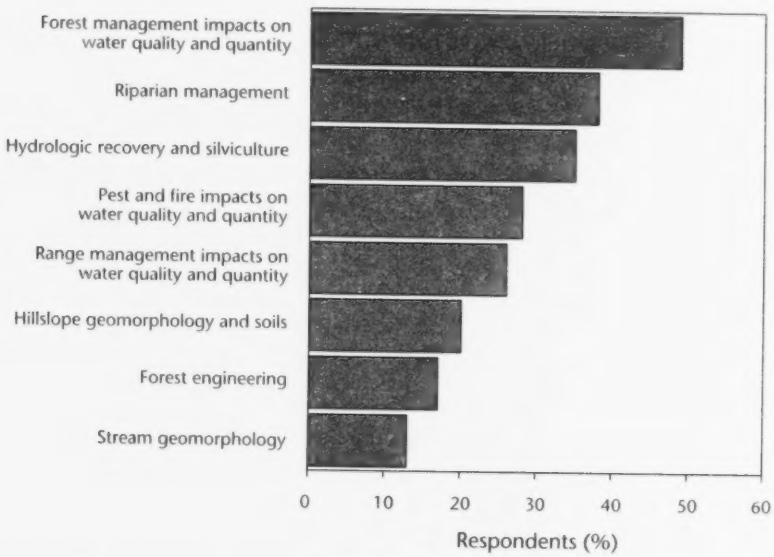

FIGURE 9 *Percentage of respondents who considered watershed processes and management topics as highest priority for forestry extension.*

3.5.4 Forest operations and planning Respondents were given a list of 11 topics related to forest operations and planning and asked to select the ones they considered the "highest priority" for forestry extension. "Sustainable forest management planning" was selected by 59% of respondents as the highest forest operations and planning priority for forestry extension, followed by "monitoring procedures" (36%), "impacts of large-scale salvage" (34%), "non-timber forest products" (32%), and "pest management" (28%) (Figure 10). Respondents wrote in a variety of suggested topics ranging from heli-logging to wood residue use, with no single topic written multiple times (Appendix 5).

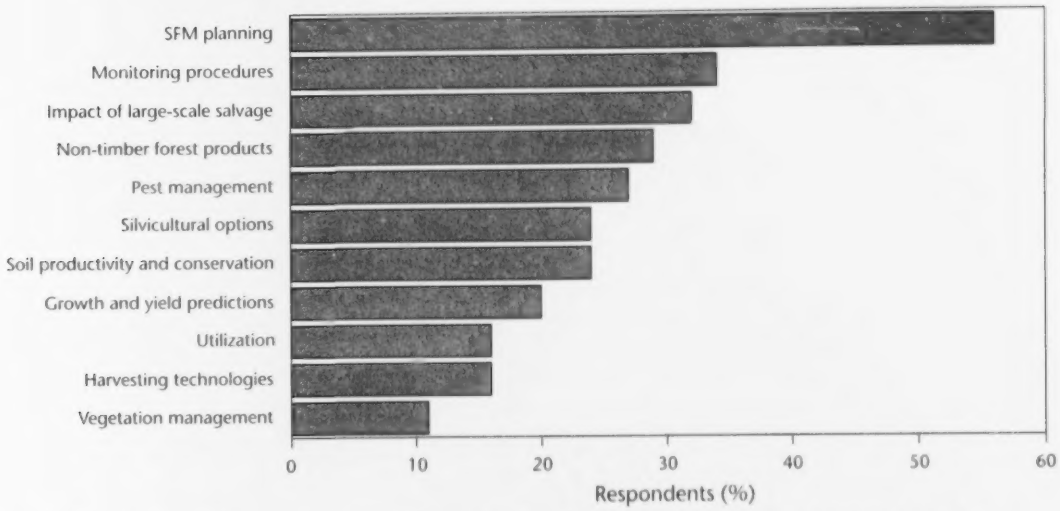

FIGURE 10 *Percentage of respondents who considered forest operations and planning topics as highest priority for forestry extension.*

3.5.5 General topics Respondents were given a list of four general topics and asked to select the ones they considered the "highest priority" for forestry extension. Information on "assessing trade-offs between social, economic and ecological indicators" was a high priority by a strong majority of respondents (66%). "Climate-change impacts on water and forests" was also a high priority (55% of respondents). About 33% said that information on incorporation of indigenous and experiential knowledge into management was a high priority. "Extension methods" had a lower frequency as a highest-priority topic (12%) (Figure 11). Respondents also wrote in suggested topics that should receive a high priority for forestry extension (Appendix 6).

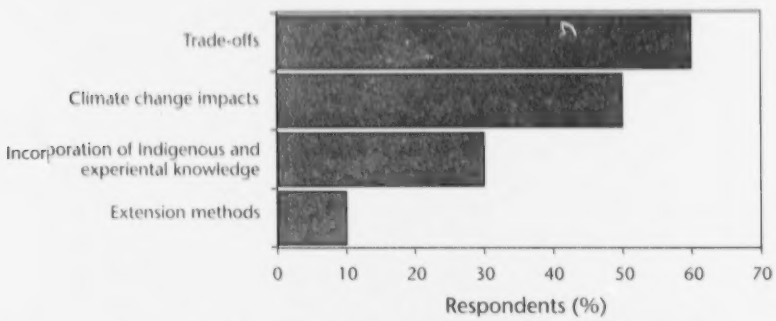

FIGURE 11 *Percentage of respondents who selected "other general" topics as highest priority for forestry extension.*

3.6 Extension Delivery

Respondents were asked questions regarding their use of and preferences for various extension delivery methods. They were asked to select their most frequently used methods from a list, the helpfulness of those methods, and their opinions about the likelihood of various extension delivery methods being used by personnel in their organizations.

Respondents were also asked whether focussing on early adopters (i.e., those who most readily adopt new innovations and who might serve as role

models for others) was an effective extension delivery approach. Over 50% of respondents across all groups, except government operations (46%), agreed that "one effective way to reach extension audiences is to focus first on those who most readily adopt new innovations." Seventy-five percent of government researchers indicated that this was an effective approach.

3.6.1 Most frequently used information sources Respondents were asked to select the five information sources they most frequently used over the past 12 months when they needed information on forest and land management. The "Internet" was selected most frequently overall, and "co-workers in your organization" was the second most frequently used source of information (Figure 12).

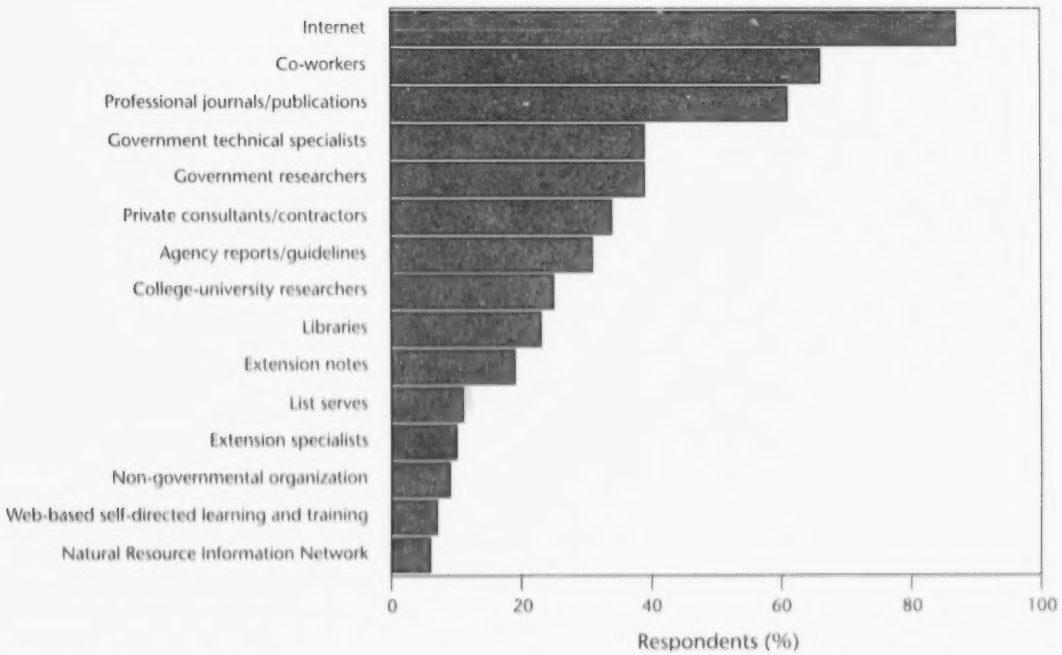

FIGURE 12 *Percentage of respondents who chose various information sources as one of their five most frequently used in past year.*

More than 80% of respondents in all groups selected "Internet" as one of their top five sources of information sources used in the past year, although slightly fewer (72%) of respondents in the government researchers group did so. Only 9% of industry respondents and 12% of government operations respondents selected "libraries," compared with 23% overall. Seventy-five percent of RNGUC respondents selected "professional journals or publications," whereas 39% of First Nations–affiliated respondents chose that option as among their top five compared with 61% overall.

Only 6% of all respondents selected "NRIN (Natural Resource Information Network)," and the highest group was industry at 8%. "Newsletters" were selected by 22% of respondents overall, but only 3% of respondents in the government researchers group selected this source. About 33% of respondents in the policy group selected newsletters. Eighteen percent of respondents overall selected "extension notes." Only 10% of respondents in the government operations group selected "list serves" compared to 33% of respondents in the industry group.

Ten percent of respondents selected "list serves" overall. No respondents in the government researchers group chose "list serves," although 4% of respondents in the government operations group and 25% of respondents in the NGO–policy consultants group did. Only 7% of respondents overall chose "web-based self-directed learning and training modules" as among their top information sources, whereas 12% of industry group respondents chose this option.

Nine percent overall chose "non-government organization technical specialists" as a top information source; 19% of respondents in the policy group and 4% of the RNGUC group selected this option. Overall, 25% of respondents chose "college or university researchers" as among the top information sources, although 58% of respondents in the RNGUC group selected this option. Only 10% of respondents in the policy group chose this option. Not surprisingly, most groups selected their own group at higher frequencies than other sources in most cases, illustrating that people tend to rely more heavily on internal information sources.

Figure 13 shows the percentage of respondents, by respondent group, who selected various information sources as one of their five most frequently used information sources. The greatest variation among respondent groups regarded the use of libraries, college-university researchers, government researchers, and government technical specialists as top information sources. Policy respondents selected "government researchers" at a much higher frequency than industry did. Respondents in the RNGUC group selected "government technical specialists" less frequently than did respondents in the government operations group. The highest level of agreement occurred among respondents groups regarding NRIN, extension specialists, and web-based self-learning tools. A much higher percentage of RNGUC respondents selected "list serves" as a top information source than did other respondents.

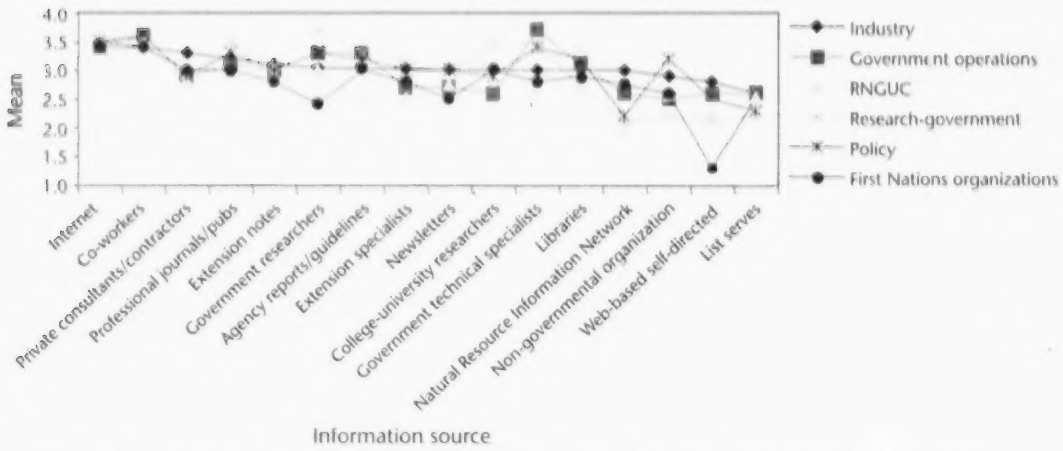

FIGURE 13 *Mean responses, by respondent group, who chose various information sources as one of their five most frequently used in past year.*

Although the number of First Nations–affiliated respondents was relatively small, the data show that First Nations used the Internet more frequently than did other groups and used co-workers as an information source less than did other groups. First Nations–affiliated respondents also used government technical specialists and government researchers less frequently than did other respondents, and used private contractors or consultants more than did other respondents.

3.6.2 Helpfulness of information sources used Respondents were asked to rate the helpfulness of information sources that they had used in the past 12 months as "very helpful," "somewhat helpful," "somewhat unhelpful," or "not at all helpful." Respondents were asked to leave the selection blank if they did not use the source in the past 12 months. The most frequently selected "very helpful" information sources were "co-workers" and the "Internet" (57% and 53% of respondents, respectively), followed by "professional journals or publications," "government technical specialists (other than researchers)," and "college or university researchers." Less helpful, but still somewhat helpful, were "NRIN (Natural Resource Information Network)," "list serves," and "web-based self-directed learning and training modules" (Figure 14).

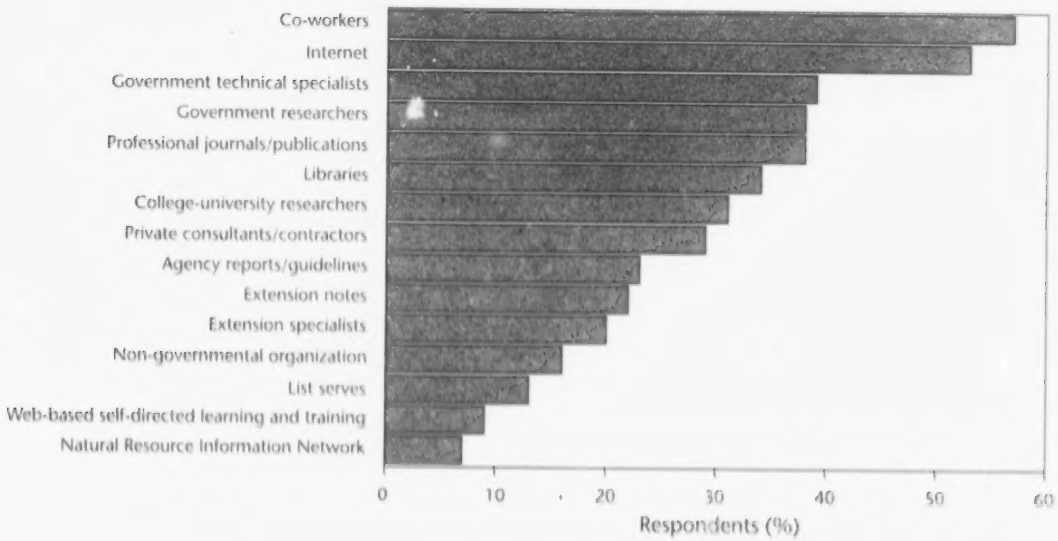

FIGURE 14 *Percentage of respondents who selected various information sources as "very helpful."*

Responses regarding NRIN were mixed. Sixty percent of industry respondents indicated that NRIN was "somewhat" or "very helpful," whereas 58% of respondents in both the government researchers group and the RNGUC group indicated that it was "not at all helpful." A strong majority (59–67%, depending on the group) of respondents in the NGO–policy consultants, government researchers, and RNGUC groups indicated that "web-based self-directed learning and training modules" were "somewhat unhelpful" or "not at all helpful." The perceived usefulness of "list serves" also received mixed responses; for most respondent groups, approximately 50% indicated that "list serves" were "helpful" whereas 50% indicated that they were "not at all helpful" (Figure 15).

Figure 16 shows the mean responses for the industry, government operations, RNGUC, and policy respondent groups. Overall, the means ranged from 2.0 to 3.8. The greatest variation in means among respondent groups was related to "government researchers" and "university-college researchers" as information sources. Not surprisingly, government researcher respondents rated their own group highly in terms of helpfulness. The greatest agreement was related to helpfulness of the "Internet" and "co-workers"—all respondent groups rated these information sources very highly.

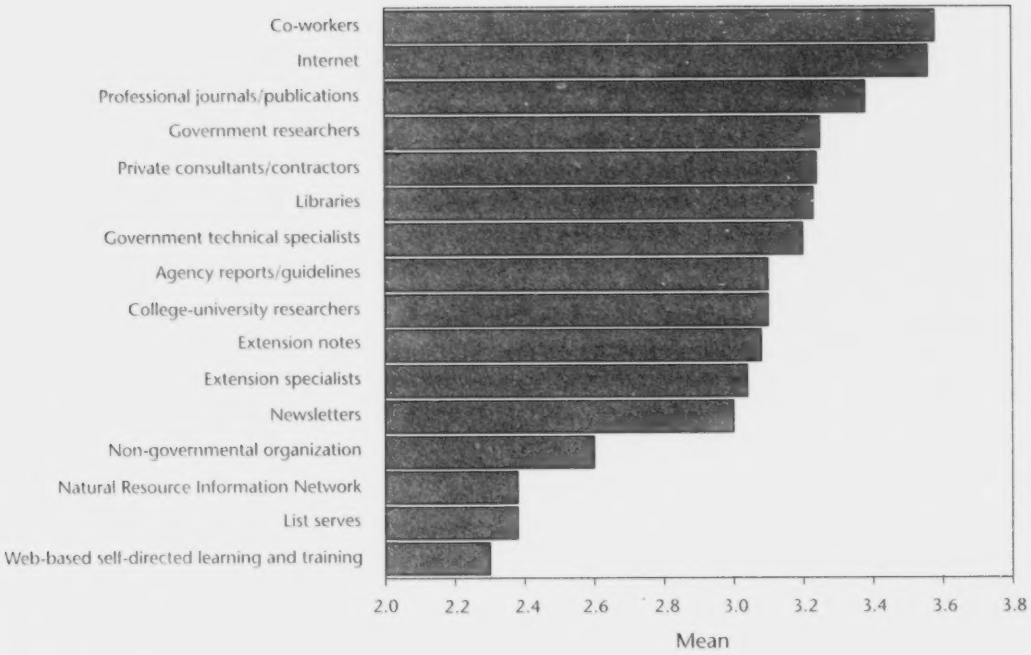

FIGURE 15 *Mean responses regarding level of helpfulness of information sources used (1 = not at all helpful and 4 = very helpful; note: to standardize responses for the purpose of this analysis, the original questionnare ranking was reversed to calculate means).*

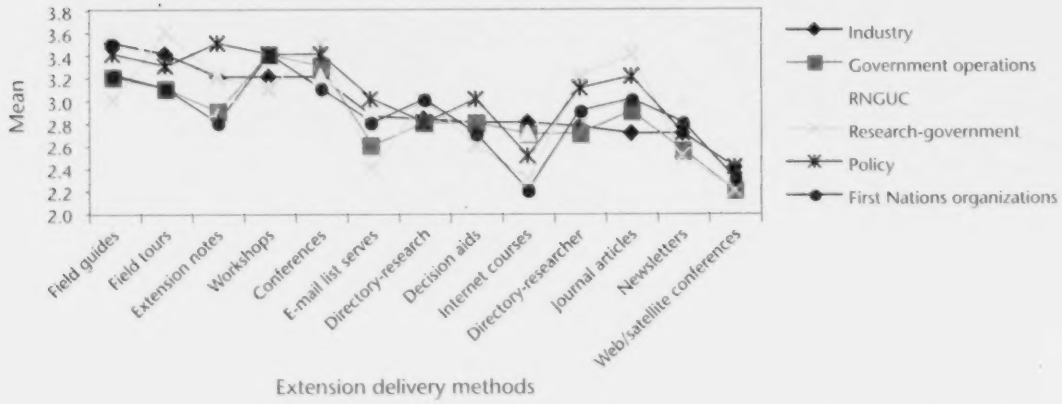

FIGURE 16 *Mean responses, by respondent group, regarding most helpful information sources (1 = not at all helpful and 4 = very helpful; note: to standardize responses for the purpose of this analysis, the original questionnaire ranking was reversed to calculate means).*

3.6.3 Likelihood of extension delivery methods to be used by personnel

Respondents were asked to rate 13 extension delivery methods based on how well they thought these would be used by key personnel in their organization over the next 5 years. Results showed that "field guides" (mean 3.36), "field tours" (mean 3.28), "skill and knowledge-building workshops" (mean 3.28), and "conferences" were most likely to be used; "web and satellite conferenc-

ing" was the most frequently mentioned delivery method "less likely to be used." Over 50% of respondents rated all but two delivery methods as "3" or better; the two that received lower likelihood ratings were "web and satellite conferencing" (mean = 2.37) and "Internet-based courses or workshops" (mean = 2.63) (Figure 17).

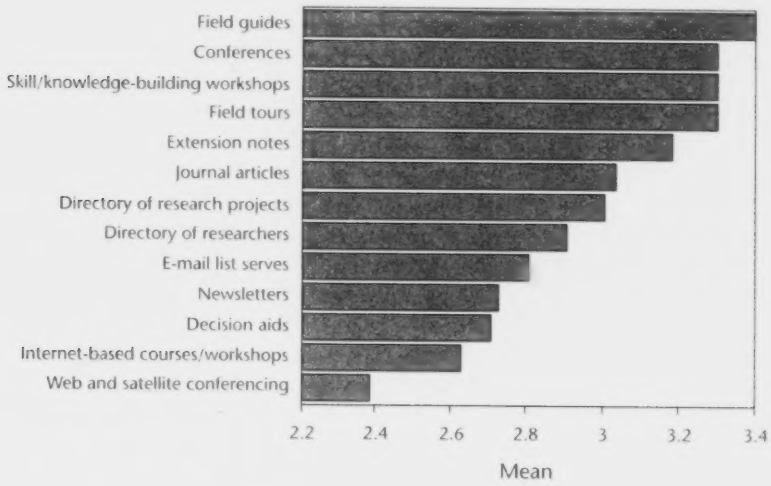

FIGURE 17 *Mean responses regarding likelihood of use of extension delivery method by key personnel in their organizations (1 = less likely to be used and 4 = likely to be used; note: to standardize responses for the purpose of this analysis, the original questionnaire ranking was reversed to calculate means).*

Figure 18 shows the mean responses for the industry, government operations, RNGUC, and policy respondent groups. Overall, the means ranged from 2.2 for "Internet-based courses or workshops" to 3.7 for "field guides." The greatest variation in means among respondent groups was related to "peer-reviewed journal articles," "field guides," "newsletters written in journalistic style," and directories of "research projects" and "researchers." All respondents rated field guides relatively highly, although respondents in the government researchers group were the least likely to indicate that personnel in their organizations would use field guides. Interestingly, respondents in the RNGUC group were the most likely to indicate that key personnel would use field guides. Not surprisingly, respondents in the industry group were the least likely to indicate that their personnel would use journal articles, whereas respondents in the RNGUC group were most likely. The greatest agreement among respondents related to the likelihood of use of "skill- and knowledge-building workshops" (all groups rated this high likely), "decision aids" (all groups rated this moderately), and "web and satellite conferencing" (all respondent groups rated this as less likely to be used).

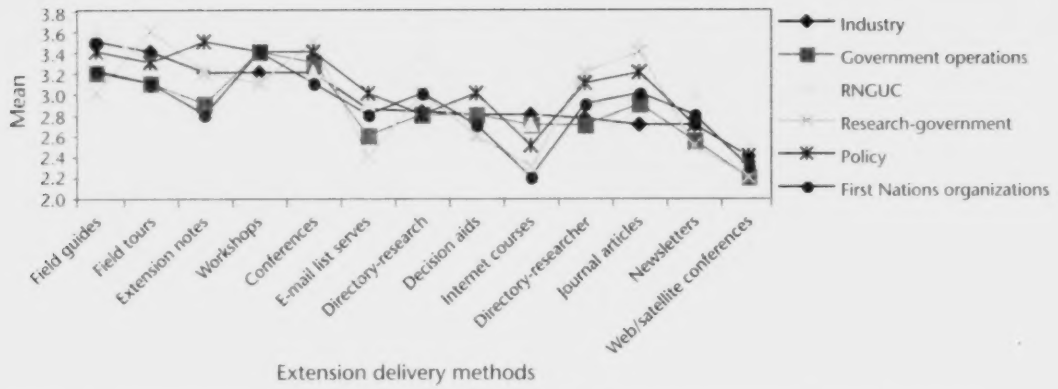

FIGURE 18 *Mean responses, by respondent group, regarding likelihood of use of extension delivery method by key personnel in their organizations (1 = less likely to be used and 4 = likely to be used; note: to standardize responses for the purpose of this analysis, the original questionnaire ranking was reversed to calculate means).*

3.6.4 Choices between delivery methods given limited funding

Respondents were offered five pairs of choices and asked to select the more preferable extension service or product from two distinct types, given limited funding. The choice between "e-mail list serves maintained by extension staff" or "site visits by extension staff" was about equal, whereas the choice between "conferences highlighting current research" or "newsletters highlighting current research" was more distinct (66% choosing newsletters). Almost 80% of respondents selected "web-based information" compared to only 20% for "printed materials." "In-person workshops" were significantly more favoured than "self-directed web-based curricula," and "hands-on 'how-to' workshops" were much more favoured than "conferences" (Figure 19).

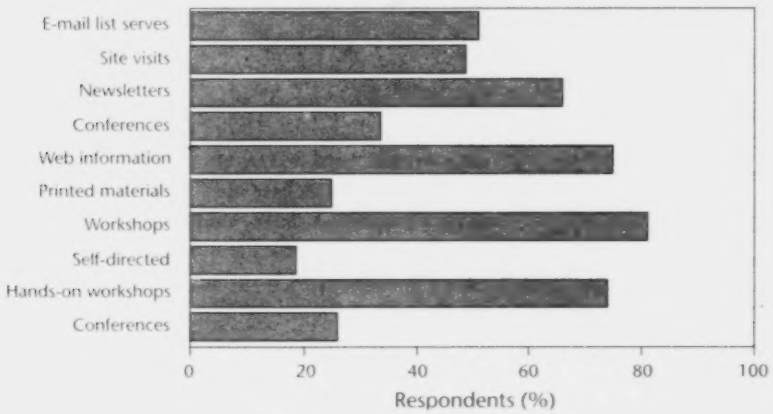

FIGURE 19 *Percentage of respondents who selected particular extension delivery options when given a choice between two methods.*

3.7 Evaluation of Existing Forestry Extension Services and Products

Respondents were asked to indicate their level of agreement about statements referring to existing extension services in the province. Eighty-six percent of respondents agreed that "a critical step in bringing science to operations, planning, and policy is determining needs and barriers within these communities." Fifty-four percent agreed that "extension organizations are neutral sources of information" and 25% disagreed.

Just over 50% of respondents believed that "extension professionals have enough technical training to be helpful to me," whereas 27% were not sure. Thirty-eight percent of respondents agreed that "extension professionals are available when I need help," 25% disagreed, and about 30% were not sure. Over 50% agreed that "one effective way to reach extension audiences is to focus first on those who most readily adopt new innovations," but 28% disagreed.

Over 50% of all respondents in all respondent groups agreed that "extension professionals have enough technical training to be helpful to me," except RNGUC respondents, of whom about 33% agreed.

Over 50% of respondents in all respondent groups agreed that "extension organizations are neutral sources of information," except for the government operations group, of whom 45% agreed. The respondents in the government researchers group most strongly agreed with this statement (75%).

Forty-five percent of respondents agreed that research is more responsive than 10 years ago, and more than 70% said that trusting the researcher is a major factor in deciding whether to incorporate research into their work.

On the whole, respondents felt most strongly about the availability of extension professionals (mean 2.4), but all statements about the efficiency, timeliness, knowledge, and relevance of existing extension services were ranked highly (Figure 20). These include, in order of agreement:

1. "Extension professionals are available when I need help."
2. "Extension professionals (whose job is to facilitate the link between science and practice/policy) have enough technical training to be helpful to me."
3. "Extension organizations are neutral sources of information."
4. "One effective way to reach extension audiences is to focus first on those who most readily adopt new innovations."
5. "The increase of forest certification in B.C. has increased the need for a co-ordinated forestry extension service in B.C."
6. "A critical step in bringing science to operations, planning, and policy is determining needs and barriers within these communities."

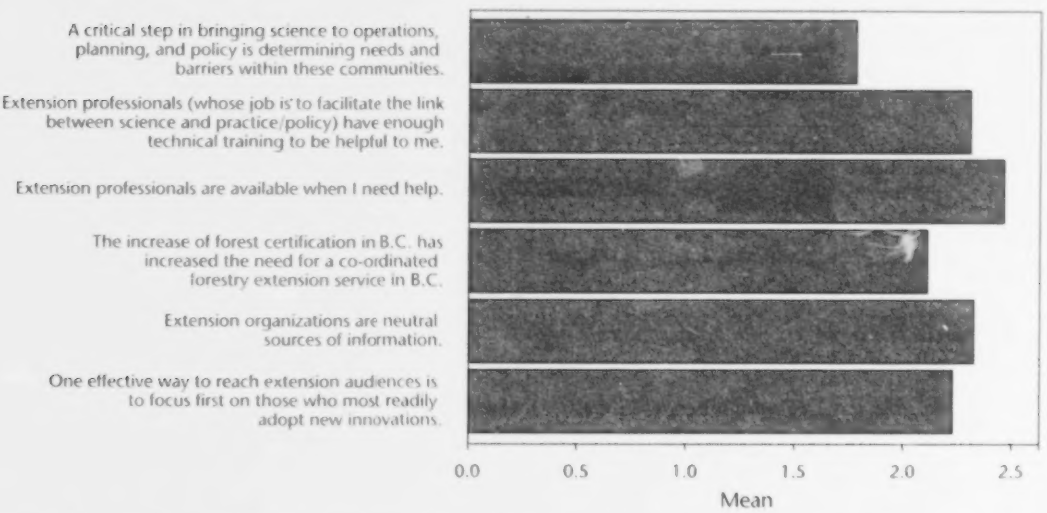
A critical step in bringing science to operations, planning, and policy is determining needs and barriers within these communities.
Extension professionals (whose job is to facilitate the link between science and practice/policy) have enough technical training to be helpful to me.
Extension professionals are available when I need help.
The increase of forest certification in B.C. has increased the need for a co-ordinated forestry extension service in B.C.
Extension organizations are neutral sources of information.
One effective way to reach extension audiences is to focus first on those who most readily adopt new innovations.
0.0
0.5
1.0
1.5
2.0
2.5
Mean

FIGURE 20 *Level of agreement with statements about the evaluation of existing extension services (1 = strongly disagree and 4 = strongly agree; note: to standardize responses for the purpose of this analysis, the original questionnaire ranking was reversed to calculate means).*

Respondents were also asked to indicate their level of agreement with statements about extension services and products currently provided by FORREX. Sixty-six percent agreed that "FORREX has increased my access to science-based information" and 21% were not sure. Sixty-one percent indicated that "when seeking information from FORREX sources, I'm generally able to get what I need quickly and efficiently." Sixty-four percent agreed that "the FORREX people I work with are knowledgeable about their subjects." A strong majority of respondents (76%) agreed that "the information provided by FORREX is written at the right level for me" and 67% agreed that "current FORREX services include information that is relevant to me."

When responses regarding respondents' abilities to generally get what they need quickly and efficiently were broken out by respondent group, responses ranged from 52% for policy respondents to 66% for respondents in the government researcher and RNGUC groups. About 33% of respondents were not sure. No less than 56% of any respondent group agreed that "the FORREX people I work with are knowledgeable about their subjects," whereas 85% of respondents in the government researchers group felt this way, and 33% of respondents were not sure. No less than 71% of any group agreed that "information provided through FORREX is written at the right level for me." (Figure 21).

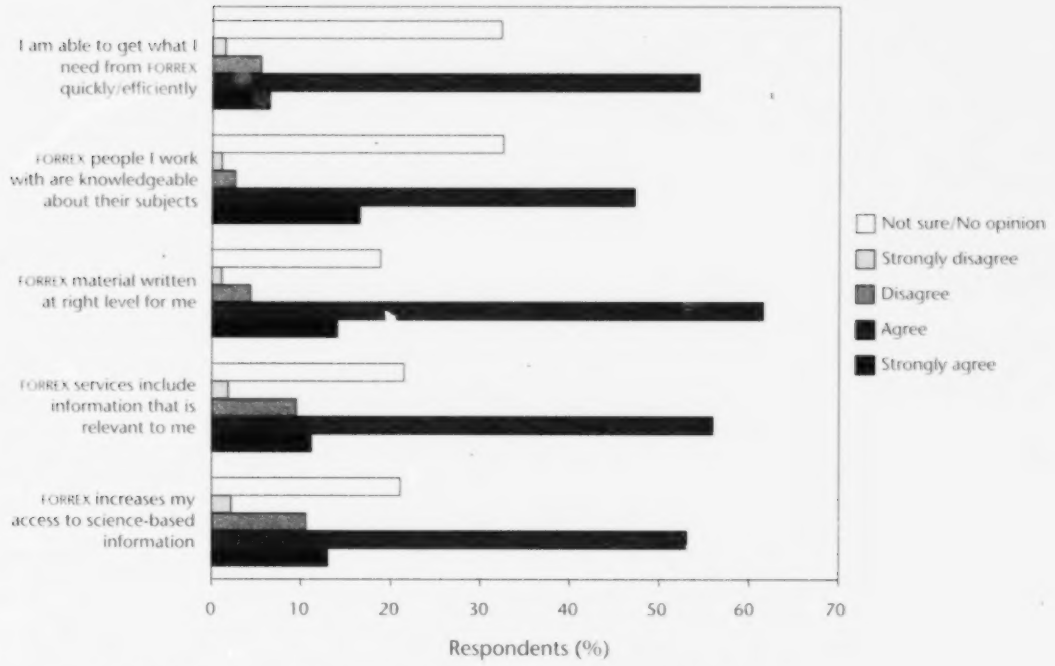

FIGURE 21 *Level of agreement with statements about extension services provided by FORREX.*

When asked to rate the usefulness of various FORREX products and services, the most frequently selected as "very useful" were: "FORREX events" (30% of respondents), "one-on-one assistance from extension specialist" (32%), "decision aids or field guides" (27%), and the *Journal of Ecosystems and Management* (27%). There was general agreement across all respondent groups regarding the usefulness of the FORREX web site (81–92%) and *LINK* newsletter (84–94%), *Streamline* newsletter, and individual FORREX web pages (Table 3).

TABLE 3 *Perceived usefulness of FORREX products and services (survey question 21). The top numeral indicates the total respondent ratio; the bottom number indicates the number of respondents selecting the option.*

		4 Very useful	3 Somewhat useful	2 Somewhat unuseful	1 Not at all useful	Total
1. FORREX web site	%	20	65	8	7	100
	n	45	148	19	15	227
2. Individual FORREX program web pages (such as Watershed or Socio-economics)	%	16	61	13	11	100
	n	30	115	25	20	190
3. *LINK* newsletter	%	24	62	8	6	100
	n	53	138	19	14	224
4. *IEM* (*BC Journal of Ecosystems and Management*)	%	27	50	13	11	100
	n	53	99	26	21	199
5. *Streamline* newsletter	%	17	50	21	13	100
	n	28	82	34	21	165
6. FORREX events (e.g., conferences, workshops)	%	[illegible]	55	11	4	100
	n	[illegible]	126	24	10	228
7. Facilitation services for problem-solving	%	15	35	29	20	100
	n	21	48	40	28	137
8. Extension planning facilitation or assistance	%	20	35	24	21	100
	n	28	50	35	30	143
9. Decision aids or field guides (e.g., SEDAS or community forestry guidebook)	%	27	47	16	10	100
	n	45	79	26	17	167
10. One-on-one assistance from extension specialist	%	32	33	15	19	100
	n	48	49	23	29	149
11. Evaluation services	%	10	36	30	24	100
	n	12	44	37	30	149
12. List serves	%	13	48	26	13	100
	n	21	79	42	21	163

A wider range of agreement across groups was evident for the following products and services:

- FORREX events: only 50% of First Nations representatives indicated that FORREX events were very useful, but this received a higher percentage across all other groups
- Facilitation services: only 38% of government operations and industry, but 75% of First Nations
- Extension planning facilitation: only 38% of government operations, but 81% of RNGUC respondents

- Decision aids or field guides: only 57% of policy, but 93% of NGO–policy consultants
- One-on-one assistance: only 43% of policy, but 100% of First Nations
- Evaluation services: only 39% for government operations, but 88% of First Nations

Fourteen respondents chose to provide written comments about the quality of existing forestry extension services (see Appendix 7). About one-half of the comments complimented the work of FORREX, the individual staff members, and the role of FORREX as a "vital link for professionals and helps a big bunch with our credibility with peers, public, and industry." One respondent wrote, "FORREX is the one organization that gives those on the periphery a chance to stay in contact with science!" Another wrote, "FORREX is now a necessary entity, especially given government and corporate cutbacks. No one else fills this niche."

Several respondents wrote of the unrealized potential of FORREX. "Until there is a sufficient body of knowledge in enough areas of interest, FORREX will not be where people go to for information. It will remain underutilized in favour of knowledge sources that are more focussed and well-known. It needs mass and momentum to become the 'go-to' source. It greatly needs to be expanded, with a larger infrastructure. Forestry extension in the province is a vital resource. FORREX provides a great foundation for this resource; however, the impact in forest extension in the province is lacking."

3.8 How Forestry Extension Should Be Paid For

Opinions were mixed regarding how provincial extension services should be paid for. When asked to select a preferred ratio between provincial government funding and cost recovery, about one-third of respondents chose "75% provincial government-funded and 25% cost recovery" and another third chose "25% provincial government-funded and 75% cost recovery." Eighteen percent of respondents chose "extension should be all government-funded" and 12% chose the 25% provincial government-funded option (Figure 22). A high percentage of respondents in some groups (such as RNGUC and industry) indicated that mostly provincial would be the appropriate option. Respondents in the policy group were split. A third of all groups indicated it should be a 50–50 split, except respondents in the First Nations–affiliated group who leaned towards provincial government funding.

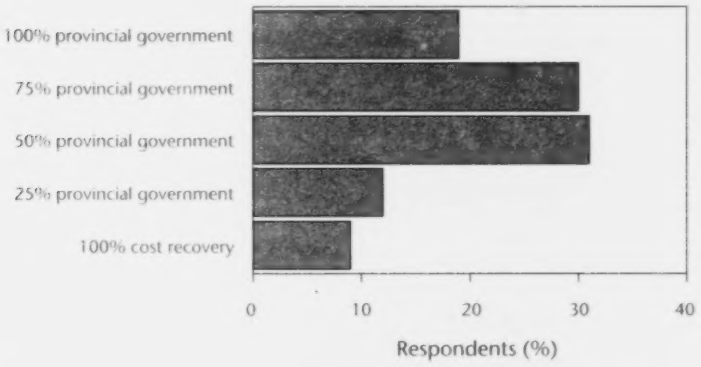

FIGURE 22 *Perceptions of how extension should be paid for (as a percentage of provincial funding).*

3.9 Summary of First Nations–affiliated Responses

Thirteen survey respondents (4.2% of total number of respondents) considered themselves affiliated with First Nations organizations: learning institutions, tribal councils, or other First Nations groups. Although this represents a smaller number of respondents from this category than aimed for (at least 22 were expected), their contribution to the survey results and conclusions are very important. First Nations are considered a high-priority target audience for forestry extension across all respondent groups; perspectives from individuals representing First Nations are essential for guiding the provincial forestry extension program objectives and strategies.

Eighty-five percent of the First Nations–affiliated respondents indicated that forestry extension is "much more important" or "somewhat more important" than it was 10 years ago. None indicated that it was less important than before. This group did not differ greatly from other respondents regarding the preferred target audience for extension; they were within the range of responses when asked about provincial government, environmental NGOs, citizen advisory groups, and community economic development organizations as target audiences. However, fewer said that consultants, licensees, and researchers were the most important target audiences than did other respondent groups. First Nations–affiliated respondents tended to favour their own group (First Nations and other Aboriginal audiences), value-added/manufacturing, community economic development organizations, and the public much higher than they rated other potential target audiences.

First Nations–affiliated respondents were the only group where all selected "Internet" as one of their five most frequently used information sources. Libraries, professional journals, agency reports, extension notes, list serves, NGOs, government researchers, and college or university researchers were consistent with other respondent groups. A higher percentage (60%) of First Nations–affiliated respondents selected the use of consultants or contractors as a frequently used information source than did any other respondent group. The level of helpfulness of these information sources was generally consistent with other respondent groups.

Twenty-three percent of First Nations–affiliated respondents indicated that extension should be 100% provincially funded, whereas 38% chose the 75% provincial funding option. None chose the option that all extension services should be paid through cost recovery.

When asked what extension methods are most likely to be used in their organizations, First Nations–affiliated respondents were generally consistent with other respondent groups, except when it came to decision aids (much higher percentage than other groups) and field guides (all First Nations–affiliated respondents indicated that this was more likely to be used). Conferences were favoured less than they were by other respondents groups.

All First Nations–affiliated respondents indicated that the FORREX web site was useful (other groups ranged from 75% to 92% of respondents). All in this group also indicated that the *LINK* newsletter was useful. The *Journal of Ecosystems and Management*, FORREX events, list serves, and the *Streamline* newsletter were considered generally less useful than by other groups. FORREX facilitation services, including extension planning and one-on-one assistance, evaluation services, and field guides were rated more highly by this group than by other groups. Those who knew about FORREX services generally agreed that they found the services of FORREX helpful.

The perspectives of these respondents are extremely valuable. Follow-up interviews and targeted surveys of this audience will provide a more precise picture of the information needs and most appropriate delivery methods.

This survey was designed to identify important information gaps and barriers to the incorporation of science in forestry operations, planning, and policy in British Columbia from the perspective of a wide range of FORREX clients and partners. The results are expected to be used as a guide for forestry extension programming in the province over the next 5 years. One of the goals of the survey was to distinguish perspectives among various client groups and partners regarding topical areas, preferred extension delivery methods, and evaluation of existing forestry extension services so that future programming can most effectively address the needs of individuals and diverse client types.

Although the response from First Nations–affiliated groups was limited compared to other client groups, responses from First Nations–affiliated individuals provided some important messages for this client group. Most First Nations–affiliated respondents indicated that many of the existing forestry extension services were helpful, as did other groups, but they also favoured the role of extension as a "facilitator" and preferred one-on-one services more than other groups did. Since many First Nations organizations tend to rely heavily on consultants, extension services to consultants who work with First Nations also indirectly serve the needs of First Nations.

Results of this survey show that the operational community prefers accessible, concise information delivered in a timely fashion that does not require significant investments of time to absorb and incorporate. Web-based training was not favoured by most operational respondents. A lack of information for decision-making is often not the greatest gap for the operational community; the challenge is making information available at the precise time that it is needed—when a decision-maker needs it—and in a form that can be easily used and with internal structures to incorporate the new information. In the words of one respondent from the operational community: "Make it short, focussed, and applicable within current regulations."

All groups agreed that the need for extension services is greater now than it has been in the past 10 years. A majority indicated that the cost of extension should be paid by some ratio of public funds and cost recovery, although the ratio to be used was not agreed upon. The greatest perceived barriers to the incorporation of science into management and decision-making were related to the lack of formal organizational processes, the profit focus of land managers, and the lack of time and funding to attend extension events. It is interesting to note that respondents relied on both high-technology approaches (Internet-based) and people-to-people approaches (such as co-workers in their organizations). Across all groups, trusting the researcher is an important factor in adoption of new innovations.

Some important areas of disagreement among groups were also noted. Not surprisingly, important differences among respondent groups were evident in the use of professional journals (operational community uses journals less than academics), the use of list serves (no government researchers selected list serves as their top five information sources), the helpfulness of NRIN (industry found it more helpful than did academics), and the helpfulness in extension planning facilitation (non-government and university researchers found it much more helpful than did operations respondents). Respondents disagreed on whether government incentives (or lack of them) were a barrier.

Not all respondents agreed about the quality of extension services as a bar-

rier to incorporation of science in operations, policy, and planning. About 50% of respondents indicated that this was a barrier, whereas just under one-half indicated that it was not. The greatest variation in responses occurred on "corporate focus on profit-related goals" and "government policy incentives for companies to be innovative." No more than 10% of any group indicated that funding was not a barrier.

Rapid and significant changes in British Columbia are greatly affecting the province's forest sector. The mountain pine beetle outbreak, changes in forest legislation, the provincial "New Relationship" with First Nations, the existence of community forests, and the increasing influence of forest certification are among the forces that are leading to an increased demand for reliable, science-based information.

The story told through this survey is that there is no "one size fits all" approach for forestry extension services. Some extension clients work within a regulatory regime and need information and knowledge to work more effectively and efficiently inside those regulatory boundaries. Other audiences require research-based information that does not assume existing regulatory boundaries so that existing policy can be evaluated against evolving science. These two types of information needs translate to different learning objectives and different extension approaches.

Several respondents recommended closer ties with professional associations such as the Association of BC Forestry Professionals and government agencies that have responsibility for extending information about laws and standards, stating that the B.C. Ministry of Forests and Range, the Canadian Forest Service, and FORREX should collaborate to better complement one another's work. Two respondents recommended that FORREX consider a leadership role in the province's continuing forestry education.

Several respondents provided comments about the provision of a "one-stop" source for research information. Suggestions included an easily searchable database of "who is doing what research," a periodic list of recent research projects, a centralized directory for research information, a list of contacts for various areas of interest, and a monthly e-newsletter with a summary of all the current research being conducted. Two respondents used the word "clearinghouse" in reference to FORREX's potential role as "the place for finding out the best places to go for the latest forestry-related literature."

Ideally, extension staff should anticipate information needs by staying on top of trends and by planning extension programs on strategic topics before a trend leads to an information gap. The timing of an extension product or service is almost certainly as important as the choice of delivery method. Being able to anticipate and plan for information needs as they surface is one of the cornerstones of the extension profession and is what makes extension an art. Unfortunately, budget limitations and cost-recovery requirements force extension staff to be project-focussed and reactive rather than proactive. The lack of time to probe, read, listen, attend conferences, and remain inquisitive under the current funding structure sometimes undermines the ability to stay ahead of trends and needs. A goal of future extension could best be described in the succinct words of one respondent, *"Keep it relevant and bring the newfound information to the user quickly."*

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Revisiting a Forest Extension Strategy for British Columbia: A Survey of Natural Resource Practitioners and Information Providers

Please help shape the future of forestry extension services in B.C.

FORREX is working with the Province of British Columbia and the Forest Science Program to create a five-year strategy for forestry extension services in B.C. Current extension services include activities such as conferences, workshops, publications, on-line peer-reviewed journals, problem-solving sessions, literature reviews, syntheses of current science-based knowledge and forums that bring together researchers and practitioners. The goal of extension services is to facilitate information exchange, problem solving, research, and organizational learning, as well as to help reduce barriers to the application of science, experiential and indigenous knowledge in natural resource policy, management, and practice.

You have been randomly selected among FORREX partners and clients for your input on the needs for forestry extension services in B.C., barriers to application of science in decision making, the future of extension services, and how well current extension services meet your needs. Your perspectives are very important and will play a key part in shaping the future of forestry extension in B.C.

The web-based questionnaire should take about 20 minutes to complete. Please submit the questionnaire by **5 p.m. Friday, September 2**. The compiled results will be available in report form by the end of October on the FORREX web site. All individual responses are anonymous.

At the end of each page of the survey, click on "submit" to advance to the next page.

Please complete survey by Friday September 2.

Thank you again.

1 Compared with 10 years ago, how important is it to have a provincial forestry extension service in B.C. specifically designed to facilitate application of natural resource science and experiential knowledge into policy, planning and operations? (NOTE: when finished with this question, click on the "submit" button to advance to the next page)

- ○ Much more important
- ○ Somewhat more important
- ○ Equally as important
- ○ Somewhat less important
- ○ Much less important
- ○ Not sure

2 Please select the category that most closely describes the affiliation in which you spend more of your time.

- ○ Major Forest Licensees
- ○ Minor Forest Licensees
- ○ Woodlot Licensee
- ○ Grazing Licensee
- ○ Private Consultant/contractor: Operations
- ○ Private Consultant/contractor: Policy
- ○ Private Consultant or contractor: Research
- ○ Provincial Gov't-Victoria-based: Operations
- ○ Provincial Gov't-Victoria-based: Policy
- ○ Provincial Gov't-Victoria-based: Research
- ○ Provincial Gov't-non-Victoria-based: Operations
- ○ Provincial Gov't-non-Victoria-based: Policy
- ○ Provincial Gov't-non-Victoria-based: Research
- ○ Federal Gov't: Operations
- ○ Federal Gov't: Policy
- ○ Federal Gov't: Research
- ○ College/University: Research
- ○ College/University: Administration
- ○ College/University: Teaching
- ○ College/University: Extension
- ○ First Nations learning institution
- ○ Tribal council employee/contractor
- ○ Other First Nations affiliation
- ○ Industry-related association
- ○ Conservation or Environmental Organ.
- ○ Education or research organization

3 Who do you think should be the primary target audiences of forestry extension services in B.C. in the next 5 years? Please rate each group as either most important, somewhat important, or least important as targets for forestry extension services.

1 Most important	2 Somewhat important	3 Least important	4 not sure
Consulting forestry practitioners			
1	2	3	4
Forest and range licensees			
1	2	3	4
Researchers			
1	2	3	4
Municipal or regional government (other than licensees)			
1	2	3	4
Provincial and/or federal government			
1	2	3	4
First Nation and other Aboriginal organizations or governments			
1	2	3	4
Environmental non-government organizations			
1	2	3	4
Citizen advisory groups			
1	2	3	4
General public			
1	2	3	4
Value-added or manufacturing businesses			
1	2	3	4
Community economic development organizations			
1	2	3	4
Public school system and education institutions (K-12)			
1	2	3	4

4 The following are potential barriers to the application of science and experiential knowledge in forestry policy, planning, and operations B.C. Please indicate whether you believe the statement identifies a huge, moderate, or slight barrier, or whether you feel it is not a barrier.

1	2	3	4	5
Huge barrier	Moderate barrier	Slight barrier	Not a barrier	Not sure/ not my area

Amount of funding to attend extension workshops and other events

1 2 3 4 5

Quality of extension services available

1 2 3 4 5

Corporate focus on profit-related goals

1 2 3 4 5

Institutional or corporate culture regarding how employees are rewarded

1 2 3 4 5

Government policy incentives for companies to be innovative

1 2 3 4 5

Perceived risk of innovations

1 2 3 4 5

Formal processes for incorporating new information into planning, operations, and policy

1 2 3 4 5

Level of trust in information sources

1 2 3 4 5

Amount of time available to incorporate innovations into planning and operations

1 2 3 4 5

5 Please select the five (5) information sources you most frequently used in the past 12 months when you needed information on forest and land management. Please do not select more than five.

- ○ Internet
- ○ Libraries
- ○ Professional journals or publications
- ○ NRIN (Natural Resource Information Network)
- ○ Agency reports or guidelines
- ○ Newsletters
- ○ Extension notes
- ○ List serves
- ○ Extension specialists
- ○ Web-based self-directed learning and training modules
- ○ Non-governmental organization technical specialists
- ○ Government researchers
- ○ College or university researchers
- ○ Government technical specialists (other than researchers)
- ○ Independent private contractors or consultants
- ○ Co-workers in your organization

6 Of the information sources you have used in the past 12 months, please indicate if the information sources have been very helpful, somewhat helpful, somewhat unhelpful, not at all helpful. If you have not used the source in the past 12 months, please leave it blank.

	1 Very helpful	2 Somewhat helpful	3 Somewhat unhelpful	4 Not at all helpful
Internet	1	2	3	4
Libraries	1	2	3	4
Professional journals or publications	1	2	3	4
NRIN (Natural Resource Information Network)	1	2	3	4
Agency reports or guidelines	1	2	3	4

Newsletters

1 2 3 4

Extension notes

1 2 3 4

List serves

1 2 3 4

Extension specialists

1 2 3 4

Web-based self-directed learning and training modules

1 2 3 4

Non-governmental organization technical specialists

1 2 3 4

Government researchers

1 2 3 4

College or university researchers

1 2 3 4

Government technical specialists (other than researchers)

1 2 3 4

Independent private contractors or consultants

1 2 3 4

Co-workers in your organization

1 2 3 4

The next five questions (Questions 7–11) ask you to think about the HIGHEST PRIORITY topics for forestry extension in B.C. Selecting a topic means that you feel that it is among the most critical in B.C. AND there is not already sufficient access to information on the topic.

Please skip the topics that you do not feel represent the most critical in B.C. and about which there is already sufficient information.

7 ECOSYTEM-BASED MANAGEMENT AND BIODIVERSITY

- O Assessing, managing, monitoring, and evaluating biodiversity
- O Contribution of protected areas and non-harvestable landbase to maintenance of biodiversity
- O Natural disturbance patterns and implications for forest management and restoration
- O Invasive species
- O Habitat requirements for species at risk
- O Ecological restoration- techniques, requirements
- O Impacts of range management on biodiversity
- O Improved inventories for ecological values
- O Other, please specify

8 SOCIO-ECONOMICS

- O Incorporating social and economic indicators into planning, operations, and policy
- O Valuing non-timber economic values for inclusion in operations, planning and policy
- O Social trends and values
- O Public participation processes
- O Other, please specify

9 WATERSHED PROCESSES AND MANAGEMENT

- O Forest management impacts on water quality or quantity
- O Range management impacts on water quality or quantity
- O Pest and fire impacts on water quality and quantity
- O Stream geomorphology
- O Hillslope geomorphology and soils
- O Forest engineering (e.g. roads and stream crossings)
- O Riparian management
- O Hydrologic recovery and silviculture systems
- O Other, please specify

10 FOREST OPERATIONS AND PLANNING

- O Sustainable forest management planning
- O Silvicultural options
- O Vegetation management
- O Growth and yield predictions
- O Pest management

- Harvesting technologies
- Impacts of large scale salvage
- Soil productivity and conservation
- Non-timber forest products
- Monitoring procedures
- Utilitization
- Other, please specify

11 GENERAL

- Trade-offs between social, economic, and ecological indicators
- Climate change impacts on forests and water
- Incorporation of Indigenous and experiential knowledge into management
- Extension methods
- Other, please specify

12 The following statements refer to your ability to access and apply new science-based information. Please indicate your level of agreement with the following:

1	2	3	4	5
strongly agree	agree	disagree	strongly disagree	Not sure/ no opinion

It's often hard to figure out who the knowledgeable person is on a topic.

1 2 3 4 5

It's difficult to incorporate new research, as it seldom seems to apply to my situation.

1 2 3 4 5

The research community in B.C. is more responsive to needs of the users than it was five years ago.

1 2 3 4 5

The requirement for management strategies that incorporate social, economic, and ecological factors has increased the need for extension services in B.C.

1 2 3 4 5

Knowing experts personally is key to my likelihood of adopting innovations

1 2 3 4 5

Trusting the researcher is a major factor for me in deciding to incorporate their research into my work

1 2 3 4 5

I am more likely to use research results produced within my organization than produced by external sources

1 2 3 4 5

---

13 The statements below refer to existing forestry extension services in B.C. Please indicate your level of agreement with the following:

1	2	3	4	5
strongly agree	agree	disagree	strongly disagree	Not sure/ no opinion

A critical step in bringing science to operations, planning and policy is determining needs and barriers within these communities.

1 2 3 4 5

Extension professionals (whose job is to facilitate the link between science and practice/policy) have enough technical training to be helpful to me.

1 2 3 4 5

Extension professionals are available when I need help.

1 2 3 4 5

The increase of forest certification in B.C. has increased the need for a coordinated forestry extension service in B.C.

1 2 3 4 5

Extension organizations are neutral sources of information.

1 2 3 4 5

One effective way to reach extension audiences is to focus first on those who most readily adopt new innovations.

1 2 3 4 5

14 Please select one of the following that most closely represents your opinion about how a provincial forestry extension service should be paid for in B.C. For this question, "cost recovery" would be done through subscriptions, event and access fees.

- ○ 100% provincial government (free to all)
- ○ 75% provincial government, 25% cost recovery
- ○ 50% provincial government, 50% cost recovery
- ○ 25% provincial government, 75% cost recovery
- ○ 100% cost recovery

15 Please rate the following types of extension delivery methods based on how well you think they will be used by key personnel in your organization in the next five years. If you don't think that the method will be used at all in your organization in the next five years, leave it blank.

	1 Likely to be used	2	3	4 Less likely to be used
Field tours	1	2	3	4
Extension notes (6 pages or fewer)	1	2	3	4
Email "listservs" managed by extension professionals	1	2	3	4
Decision aids	1	2	3	4
Field guides	1	2	3	4
Peer reviewed journal articles	1	2	3	4
Newsletters written in journalistic style	1	2	3	4
Web and satellite conferencing	1	2	3	4
Directory of research projects containing brief abstracts about potential practical applications	1	2	3	4

Directory of researchers (contact information)

1 2 3 4

Skill and knowledge-building workshops

1 2 3 4

Conferences

1 2 3 4

Internet-based courses or workshops

1 2 3 4

Limited budgets often require extension providers to make difficult choices between types of extension services and products they offer. For questions 16 to 20, please select the one in each pair that you consider the most preferable, given limited funding.

16

- O conferences, OR
- O hands-on "how to" workshops

17

- O self-directed web-based curricula, OR
- O in-person workshops

18

- O web-based information, OR
- O printed materials

19

- O conferences highlighting current research, OR
- O newsletters highlighting current research

20

- O email list serves maintained by extension staff, OR
- O site visits by extension staff

21 The following forestry extension products and services are currently provided by FORREX. Please indicate how useful each of the following has been to you, in general. If you have not used the product or service, please leave it blank.

1 Very useful	2 Somewhat useful	3 Somewhat unuseful	4 Not at all useful

FORREX website

1 2 3 4

Individual FORREX program webpages (such as Watershed or Socio-Economics)

1 2 3 4

LINK newsletter

1 2 3 4

JEM (Journal of Ecosystems and Management)

1 2 3 4

Streamline newsletter

1 2 3 4

FORREX events (e.g. conferences, workshops)

1 2 3 4

Facilitation services for problem solving

1 2 3 4

Extension planning facilitation or assistance

1 2 3 4

Decision aids or field guides (e.g., SEDAS or community forestry guidebook)

1 2 3 4

One-on-one assistance from Extension specialist

1 2 3 4

Evaluation services

1 2 3 4

List serves

1 2 3 4

22 The following statements ask your opinion about extension services currently provided by FORREX. Please note whether you strongly agree, agree, disagree, or strongly disagree with the following statements.

1	2	3	4	5
Strongly agree	Agree	Disagree	Strongly disagree	Not sure/ no opinion

When seeking information from FORREX sources, I'm generally able to get what I need quickly and efficiently.

1 2 3 4 5

The FORREX people I work with are knowledgeable about their subjects.

1 2 3 4 5

The information provided through FORREX is written at the right level for me.

1 2 3 4 5

Current FORREX services include information that is relevant to me.

1 2 3 4 5

FORREX has increased my access to science-based information.

1 2 3 4 5

23 What is your age range?

- O less than 35
- O 36–45
- O 46–55
- O 55+

24 If you consider part of your professional role to provide information to other natural resource-related personnel, what percentage of your time would you say is devoted to this?

- O none
- O 1–25%
- O 26–75%
- O more than 75%

25 In which region of B.C. does the majority of your work take place?

- ○ Southwest or coastal (not Victoria)
- ○ Victoria
- ○ Northern Interior
- ○ Southern Interior
- ○ Outside of B.C.

26 This is the last question. Please provide your recommendations regarding the future of forestry extension in B.C. What would you like to see, and how do you recommend that it be accomplished? Write as much as you like.

If you have finished the survey, click on the "submit" button below to submit the completed survey.

Submit

APPENDIX 2 "Other" High-priority Topics for Ecosystem-based Management and Biodiversity

For survey question 7, respondents chose to write in the following "other" high-priority topics for ecosystem-based management and biodiversity extension services:

- *Mapping and inventory of natural resources*
- *Cutblock-level planning for reforestation and rehabilitation*
- *Forest health: fire issues, bark beetle, risk management, climate, etc.*
- *Insect problems and pest management*
- *Ecological implications of mountain pine beetle management options*
- *Roles and impacts of forest pathogens and insects*
- *Private land forestry*
- *Mountain pine beetle: The pine beetle–recovery of forests and animals*
- *Reforestation of pine bark beetle devastation areas*
- *Effectiveness of the decision-making process*
- *Making decisions that result in effective action*
- *Sustainability of retention harvesting and silviculture*
- *Environmental trends and forest management*
- *Ecosystem-based management: Ecosystem integrity becoming secondary to profits*
- *Managing for sustainable consumption*
- *When there is the will, there is a way*
- *Geological, climatic information*
- *First Nations: use of traditional ecological knowledge as management tool*
- *Improve, enhance, and respect First Nations' institutions*
- *Biodiversity: contribution of harvested lands to biodiversity*
- *Silvicultural effects on biodiversity*
- *Compatibility of timber harvesting and biodiversity*
- *Species at risk: simple field-level indicators for species at risk*
- *Monitoring responses of species at risk to habitat changes*
- *Reporting on rates of change to habitat features*
- *Access management (all modes, particularly motorized)*
- *Impacts of access*
- *Access management*
- *Access management (old and new logging roads)*
- *Gaps in wildlife inventories and effects of access*
- *Climate change*
- *Effect of climate change on biodiversity values*
- *Impact of climate change on land management*
- *Adaptations to climate change*
- *Yield projections for second-growth stands caribou*

APPENDIX 3 "Other" High-priority Topics for Socio-economics and First Nations

For survey question 8, respondents chose to write in the following "other" high-priority topics for socio-economics and First Nations extension services.

- *Secondary manufacturing and value added*
- *Manufacturing optimization and innovation*

Communities:

- *Long-term effects of current forestry practices*
- *Value-added community-based forestry*
- *Sustainable forest-based communities*
- *Effective rural community economic development tools and approaches*
- *Future of resource-based communities and small businesses*
- *Community economics as planning requirement driver*
- *Climate change: adaptation requirements*
- *Beetle impact on forest-dependent communities*
- *Impact of falldown in allowable annual cut due to pine beetle*
- *Tourism*
- *Social impacts of pine bark beetle*
- *Sustainability of small resource-based communities*
- *Public education of actual forestry practices and problems*

Community Forestry:

- *Economic and ecological benefits of community forests*
- *Community forests*
- *Community-based forestry versus industrial*
- *Ecosystem services supplied by forests*
- *Valuing ecosystem services*
- *Positive economic impacts of ecosystems and species*
- *Value of forest ecosystems (natural capital)*
- *Markets for ecosystem services*
- *Incorporating ecological values into cost/benefit*
- *Economic value of ecosystem goods and services*
- *Value of wetlands, temperature-sensitive streams*
- *Urban/rural interface: fire*
- *SEAfor recovery planning*
- *Research and development*

Innovation:

- *Competition and innovation*
- *Reward the innovator, sustainability and long-term growth*
- *Political will to manage*
- *Public involvement in forest certification*
- *Basic ecological education foundation for public participation*
- *Public input into forest management*
- *Political and economic barriers to change*
- *First Nations issues, policy/political changes*
- *Planning for First Nations desires for increased harvesting*
- *Managing for First Nations cultural values, access*
- *Use of traditional ecological knowledge in operation planning and management*

- *Involving First Nations in forest management*
- *Recreation: return wildland recreation management to B.C. Ministry of Forests and Registered Professional Foresters*
- *Wildland recreation management by B.C Ministry of Forests, Registered Professional Foresters, and industry*
- *Public recreation on forest lands*
- *The balance between stumpage and company profits*
- *Value-added bioproducts (fuels, chemicals, and materials)*

APPENDIX 4 "Other" High-priority Topics for Watershed Management and Processes

For survey question 9, respondents chose to write in the following "other" high-priority topics for watershed management extension services.

- *Holistic watershed issues (forestry farms and urban)*
- *Holistic management, Ceteris paribus*
- *Multi-sectoral cumulative effects limits to harvest*
- *Cumulative effects*
- *Water economics*
- *Alternative silviculture to manage hydrologic risk*
- *Post-wildfire potential effects on flooding and erosion*
- *Non-linear riparian management and natural range of variability*
- *Working with natural processes to optimize net benefit*
- *Inventory on current state of watersheds: water plus geomorphology*
- *Assess, monitor, and evaluate watershed processes*
- *Biological indicators such as Benthic Index of Biotic Integrity (IBI)*
- *Climate change and loss of water supplies*
- *Climate change and water*
- *Compare all against climate change impacts*
- *Managing for climate change*
- *Climate change is huge*
- *Distinguish climate change impacts from treatment impacts*
- *Mountain pine beetle: impacts of salvage logging after beetle-kill and fire*
- *Impact of salvage harvesting on the watersheds and biodiversity*
- *Very important due to pine beetle infestation*

APPENDIX 5 "Other" High-priority Topics for Forest Operations and Planning

For survey question 10, respondents chose to write in the following "other" high-priority topics for forest operations and planning services.

- *Layout and biodiversity/riparian*
- *Climate change modelling*
- *Silviculture approaches to address mountain pine beetle and climate change*
- *Fuel treatment and hazard abatement*
- *Improving quality and value of outcomes and output*
- *True definition of sustainable*
- *Non-timber forest values*
- *Growth and yield of high-retention silviculture systems on coast*
- *Utilization of wood residue in pulp and paper*
- *Proper species and ecosystem inventory monitoring*
- *Alternative silviculture system options, methods*
- *Retention options for hand falling; conflict [with] WCB*
- *Strategic for management planning: priority use zoning*
- *Yield projections for second-growth stands*
- *Use and utility of forest biomass; monitor CC*
- *Heli-logging*

APPENDIX 6 "Other" High-priority Topics for General Extension Services

For survey question 11, respondents chose to write in the following "other" high-priority topics for general extension services.

- *Potential for synergies amongst good indicators*
- *Cumulative impact management: current approaches*
- *Cumulative impacts of human uses other than forestry*
- *Increased value and reduced environmental impact*
- *Hard links between society, economy, and ecology*
- *Forest statistics for policy making*
- *Gap and risk analysis of legislation*
- *Stewardship plus small, selective, locally owned logging*
- *Forests and forestry achieving public expectations*
- *Incorporate logic, practicality, KISS, non-economic variables*
- *Decision-making processes: transparent, integrate*
- *Web-based extension methods*
- *Carbon sequestering and other innovative measures*
- *Long-term view/projections*
- *Integration (**not** trade-offs) of social-economic-ecological*

Barriers to Extension

- *The single largest obstacle, and the biggest opportunity, is the absence of effective governance leading to effective action that incrementally improves the quality and value of outcomes and outputs, and reduced environmental impact. In other words, better leadership is a prerequisite to better management. The value-based paradigm has eclipsed the management by objectives paradigm, and until policy and decision makers improve the quality of the decision-making process (including monitoring, learning, and replanning), resource management in British Columbia will not fulfill its potential, and will fall short of what is possible and desirable.*
- *It became clear during discussion that* MOF *policy is a barrier to incorporating the results into practice. The* MOF *is too slow accepting new research and incorporating it into acceptable practice.*

Choices between Extension Methods

- *I prefer the conferences and hands-on "in the field" workshops, where relevant, but recognize the costs involved are limiting the opportunities for these. The ideal is to get together at these events with the peers from government and other licensees that we don't usually interact with. The compromise would be web-based information, where possible. While there is ever a need for increased information and extension services, the licensee I work for is pushing for the bare minimum investment to archive the minimum acceptable standard. Too bad.*

General

- *Need an "extension-services" workshop that is attended by key decision makers in government, industry, and universities, with the aim of developing a 5-year provincial plan for targeted extension services (including priority topics); this must be sanctioned and endorsed by the key decision makers and become an integrated initiative within British Columbia. It must involve more than* FORREX *extension and deal with root-causes of our declining investment and interest in extension and knowledge transfer in British Columbia.*
- *Take a far more practical approach. Provide more information on how other professionals in the province have handled similar situations.*
- *In* BCTS *we are implementing a learning program. This survey has helped raise the nature of extension services and the importance of it. The priority seems to be making the wheels turn, but with little acknowledgement of the need to be informed and skilled to a professional level in the practice of forestry.*
- *Greater awareness connectivity to practitioners and focus on credible science versus the opinion of scientists.*
- *Extension services will need to account for a professional reliance framework.*
- *Prioritize to meet the top 3–5 critical needs.*
- *Professionals, industry, governments, institutions, and communities need to develop an integrated strategic plan for each region in order to become effec-*

tive at understanding sustainability in that region. Extension support comes out of that plan and commitment to implementation.

- *Better access and awareness building.*
- *(1) Let people know what "extension" means; (2) use new methods like Douglas McKenzie Mohr's Community Based Social Marketing; (3) do more logic modelling that will focus on the true groups that can benefit or create change; (4) slogans: check with Patrick Walton at* TRU *to see how his work with children is showing we need to get back to the "Oscar Myer Weiner" song to embed our messages; (4) link up field researchers with organizations that can link directly to the public. Dr. David Green said this in 1999 at* UCC's *Species at Risk conference and it just isn't happening enough.*
- *Before we talk about instituting forestry-related extension work in British Columbia in a big way, we need to carry out a lot more of the background, forestry-related research in all aspects of all the topics outlined in this questionnaire. Only then will forestry-related extension work be meaningful.*
- *Would like to see a more prominent supporting role by* ABCFP *with basic information and practical workshops more readily available or accessible. These should also be supported by British Columbia government.*
- *Continue current approaches, taking advantage of Internet and e-mail to make people aware. Always remain prepared to respond and be flexible as things never remain static for long.*
- *I think a start would be to outline the services available on the web site, many of which I wasn't aware of. I would also think it worthwhile to canvass the forestry community on the type of problems that are most relevant to practicing professionals and technicians. It would also be very useful to incorporate the needs of all industry supervisors, managers, and owners in the dispersal of forestry learning with a focus on field-related workshops.*
- *Future depends on how assessment and planning is conducted at all levels in British Columbia: extension could focus on how individuals, communities, and First Nations can effectively participate to get their views effectively considered in a timely manner.*
- *Effective extension means employing good communicators, minimal delays in responding to e-mail requests, and knowledgeable personnel.*
- *Larger integration of the research organizations into the practice of forest-related issues. We need to focus on items that can bring tangible items to the industry. And most importantly, there needs to be a stronger integration of the whole forest industry value chain, right from trees and plantations to saw mills and related lumber products and to pulp and paper mills. These integrations will lead to better utilization and recognition of our science communities to our most valued natural resource sector.*
- *There are often conflicts between what forest practitioners recommend and what* NGOs *and community groups wish to have happen. Perhaps forest extension can serve a role in helping these groups share a common research/scientific information base upon which to find the compromise between their competing values.*
- *Maintain accessibility to information and opportunities for shared learning.*
- Forest and Range Practices Act *objectives; baseline data for innovative strategies; monitoring forest "state" indicators.*
- *Long-term economic sustainability, not long-term growth. There are too many considerations other than growth that need emphasis.*
- *Keep up the good work. As global warming changes the climate, forestry and new species will change forest practices forever.*

- *Forestry extension should increase its role in educating the public and professionals regarding the new research results and knowledge.*
- *I'm unaware of* FORREX*, but see a tremendous need for ongoing training of forestry personnel on a variety of issues. We have just gone through a very bleak period where most forestry work was cancelled or reduced considerably, so there is a real need to get information out to practitioners.*
- *Co-ordination by provincial government to ensure "one-stop shopping" for extension services.*
- *Much of my work during the past few years that has required "extension" has been strategic-level modelling of forest management and environmental trends. There are few publications or events held in British Columbia that are relevant to this specialized type of work (I've organized a few in the past), and those that do occur are typically held late in the government fiscal year end—when such projects are being completed, as they are typically funded through government sources (*FRBC*,* FIA*,* FII*, etc.). The result is that government and academic staff are typically the vast majority of attendees as they have the most free time at that time of year, although they aren't the "hands-on" experts that one would really like to attract. Suggestions: (1) more events such as workshops of practitioners, perhaps held regularly (in terms of calendar year); and (2) hold events either early in the government fiscal year or, failing that, early in the winter (November/December), but not during February/March. Failing that, regular events at the same time each year, even the end of fiscal, would allow practitioners to plan ahead and would increase the chance of attendance. As it is now, my lack of free time at the end of the fiscal year has resulted in most of my "extension needs" being met by through whatever sources are available on the Internet. I see that my survey answers are swayed (perhaps too) heavily in that direction.*
- *Weyerhaeuser BC Interior employs research and extension as a competitive strategy and as a result, manages the innovation cycle (problem identification to solution to extension to implementation) in two ways. Solutions to problems deemed as a having a proprietary interest are delivered with internal resources and processes. Solutions to problems deemed as having a public interest are delivered through the variety of public research/extension agencies available in British Columbia. Weyerhaeuser's comments in relation to the* FORREX *questions are focussed towards the role that agencies outside Weyerhaeuser can help meet our extension requirements.*
- *Encourage a multidisciplinary approach and stress the packaging of information and the development of tools that will engage and empower those who have not traditionally been involved in discussing resource issues.*
- *Forestry extension services need to provide valuable service and information—information useful to current and future resource holders. The current trend of subjugating direction and authority to direct "stakeholders" is damaging to the resource as well as society at large. "Owners" of the resources, responsible for environment, etc., are owners without say. The "tenant" is dictating to the landlord.*

Continuing Education

- *Professional associations need to embrace mandatory continuing educations to force individuals to spend the time to stay current.*

Cost Recovery

- *More funding.*

Full Cost Recovery

- *I think that eventually extension will have to be full cost recovery, with users eventually having to pay.*

Some Government Funding Support

- *Funding support from government should come from revenue taxes on forestry/logging companies.*
- *Government seems to be off-loading many of the costs and obligations for science-based management of public forest lands onto industry and the public.* FORREX *is providing a critical role in forest management by taking up the slack left by many arms of the government. Because of this, I feel that government should be taking a stronger and more active role in supporting* FORREX *programs.*
- *Keep it accessible to environmental non-government organizations (*ENGOs*) and the public. Cost recovery often has the effect of shutting out both* ENGOs *and the public.*
- *The funding and leadership for this should come from the province, as it is the ultimate steward of the forest resource.*
- *Forestry extension requires sustained funding from the provincial and federal governments, although users should contribute a reasonable portion of the costs. Greater integration of expertise located at post-secondary institutions would be desirable.*
- *Government should provide some extension services with dedicated staff and budget. These people would then work with agencies such as yourself, co-ops, etc.*
- *Joint federal – provincial funding similar to* FRDAs.
  During the transition period the costs could be supported by government and industry, and users covering 50% of the costs. Then this would allow the users a say in what is included in the extension service and how it is maintained on an ongoing basis.
- FORREX *does a great job, and they should be given increased funding to expand, and try and recover more fee-for-service type work; have a network of consultants with expertise in specific areas, who can help out* FORREX *staff, when needed.*
- *Expand it, fund it well.*
- *Forestry extension requires guaranteed funding and support from the provincial government, as well as voluntary or compulsory participation of licensees. The government must conduct and encourage extension if industry is to follow. Increased collaboration is also required between industry, government, and researchers. Applied research is a great way of conducting extension work that is cost-effective and can contribute to both science and management.*
- *With over 20 years working in the forestry sector, the forestry extension program is considered to be a government-driven program. It has a low profile in my professional practice. I would like to see the organization take on a* FERRIC*-like business mandate, whereby industrial operational needs and (or) applied research are considered, funded, and resolved on a joint-partnership basis.*

Integrate into Existing Funding Sources

- *Fund extension components within existing funding sources (i.e., FIA), rather than have extension as a separate process. Specifically, FORREX should work to better integrate with projects funded through FIA and other sources (i.e., Mountain Pine Beetle Initiative).*

Delivery Methods

- *Web-based with real-time lectures or briefing on new methodologies.*
- *Reports that are map-based. Improve partnerships with the Community Mapping Network and communities in general. Incentives by the government to help keep information from communities up to date and linked to the NRIN search engines.*

Internet/Web-based Delivery

- *Focus on the Internet. All published reports should be easily accessible on the Internet.*
- *Old stuff put online where it can be accessed through the Net. Today, if it is not on the Net, it does not exist.*
- *Limit use of e-mail and web site; although these can be cost-effective, one has to ask how many people are using them or aware of them.*
- *Web-based learning and field-orientated workshops are good tools, but time consuming.*
- *Advise government, timber companies, and contractors where to find forestry extension information by providing annual lists and place a link of the Ministry of Forests and Range web site. If the word doesn't get out, I am less likely to make reference to various sources.*
- *Interpretation of scientific information for the public through web-based products is an area in which I think FORREX could be very helpful (gathering information and putting it in forms that can be converted to web sites appealing to a variety of audiences).*
- *Introduce more web-based self-learning modules.*
- *While the web is one training tool, many British Columbians in the hinterland either do not have web access or only have "dial-up" with limited ability to look at large downloads, which curtails the quality and quantity of information that they can access.*
- *A "search" option on the FORREX web site would be helpful.*
- *I like the trend to web-based information and tools. Allows one to more directly obtain what is needed compared to conferences/workshops that are more "one size fits all"—more expensive in dollars and time.*

Workshops and Courses

- *Nothing will take the place of one-on-one communication in person or by phone. Nothing will take the place of group field trips.*
- *Workshops are what I find most useful; field trips are most informative, but I seldom find one that I will attend.*
- *Investigate use of software for online seminars and information sharing (e.g., WebEx).*
- *Web-based training courses are the cheap form of staff training adopted by government as their answer to save costs, but they are the worst form of*

training ever. Field staff are stuck to computers too much already. Go back to workshop training.

- *Hands-on workshops on relevant topics, plus summary notes of new research and how it may be applied, plus available extension specialists to assist with specific issues.*
- *In my field, the best way to inform practitioners about new research results is with hands-on "in the forest workshops." The problem is that there aren't enough people knowledgeable enough (in my field) to offer them, thanks to retirees not being replaced, downsizing, and lack of funding. Last week, I attended a workshop in the field intended to showcase and obtain feedback on the results of a PhD candidate's research. The objectives of the workshop were achieved.*
- *Conferences are good to get an overview of what is out there, but hands-on workshops should be included with practical exercises and field tours.*
- *Courses on implementation of* Forest and Range Practices Act; *forestry "refresher" courses for* RPFs, *and* RFTs *and forestry workers; what's new in forestry: latest science; species at risk and forestry; awareness level courses to* NGOs *and general public; introductory forestry courses (soils, layout, fire control, safety, silviculture,* GPS/GIS, *surveys, cable logging), or links to schools and universities that can provide this sort of training via correspondence or web-based training. Please note: there is an unrealistic idea that the "Internet" is the best way to provide training. Problems with basic literacy are a major barrier to training courses for First Nations and vocational students. The cost of travelling to urban centres affects the ability of people from small towns to get quality education. Perhaps a training subsidy for remote locations would help.*
- *Affordable courses, listed in the* FORREX *list serve.*

Conferences

- *Ensure the work being conducted is in demand; we are doing studies to improve current management or solve a problem, not just doing projects for the sake of doing a project.*
- *Preparation of more notes or field guide that take research results and translate these into operational actions.*
- *Yearly conference with a provincial theme—the biodiversity monitoring conference was great. I think the* LINK *magazine is great.*

Delivery, General

- *One-on-one contacts with extension people, highly focussed seminars, and well-written newsletters, which list contact people for finding out more about a topic.*
- *Dispersed sessions or workshops around British Columbia to ensure all have a reasonable opportunity to attend and contribute. Clear interpretation of new legislation, implications to actual field practices, clear outline of due diligence, etc.*
- FORREX *should have a "back to basics" focus on extension. I suggest a shortening of the 1998 mandate to "We are dedicated to providing learning opportunities to promote healthy and sustainable ecosystems and communities in British Columbia. The primary goal of the Partnership is to facilitate co-operative and collaborative extension between the partnering agencies."*

- *While the 2004–2005 Annual Report mentions three extension goals, the scope has broadened significantly to include Canada, and the Strategic Direction 2005 suggests a greater focus in research co-ordination, building interdisciplinary ventures, hosting research forums to exchange ideas, expanding into other sectors, and resolving the undergraduate crisis. All areas of peripheral interest to extension, but not directly related to effective extension.*
- *A key* FORREX *role is to help vet the proliferation of mountain pine beetle publications and web sites and work with those partners (*MOFR, CFS, UBC*) involved in the current wave of mountain pine beetle research and insist on interagency collaboration with extension. Front-line staff is inundated with an ever-increasing amount of information and extension opportunities and it is becoming increasingly difficult to determine what's relevant. The demand for information extension will continue to grow and effective delivery will be a key measure of success.*
- *Keep it relevant and bring the newfound information to the user quickly.*
- *Relationship with other provincial initiatives such as* SPI *(Wildlife Species Inventory).*
- *Practical research including guidebooks and tours on the ground to demonstrate; conference to determine current and future research needs on an ongoing basis; dedicated funding (i.e., $0.02 per m^3 stumpage).*
- *Practitioners require easily accessible, concise information delivered in a timely fashion. For me, this often takes the form of journals or extension notes as they can be reviewed at anytime and be disseminated cheaply and quickly. I have very limited time resources, so this is a critical component of any extension work.*
- *Web courses and Internet-based training [for]organizations when available and when they are "good" at something (i.e. Columbia Mountains Institute).*
- *Forestry extension must be field-oriented and practical to use, and must consider economics of the day and the situation of the forest industry. Industry must be viable and profitable, otherwise we don't have an industry and no need for extension services.*
- *Act as a clearinghouse, one-stop for finding out the best places to go for latest forestry-related literature.*
- *Better identification of pending resource management issues with direction of information before they become huge issues (i.e., being proactive as opposed to reactive).*
- *Whoever is doing the training, be sure they know what they are talking about. PhD doesn't necessarily mean knowledge.*
- *Focus on both basic information (research results and regulatory or planning requirements) and on utilizing and incorporating the basics in forest management practices, strategies, and land management plans. Perhaps we need a fuzziness index—some results, processes—clear on impacts, on benefits. Others are less clear—more complex or related to information that is difficult to obtain.*
- *Forestry extension needs to be more visible and hands-on (tailored to the audience).*
- *A list of contacts for various areas of interest; extension people [should] be present in organizations at the field level to identify needs and provide practical support.*
- *Planning for extension activities can sometimes get in the way of doing them by diverting funds from products.*

- *I strongly support the mandate of FORREX; however, I also see a need for government agencies to have a responsibility for extending information about their laws, regulations, standards, guidelines, best practices, and research. The Ministry of Forests and Range should offer extension services in partnership with FORREX and the Canadian Forest Service. Attention should be paid to ensure that these organizations collaborate in order to complement one another's work.*
- *I'd like to see examples of how operational trials solved forest management problems identified in the Southern Interior (field trips, newsletters). I'd like to see more on how one can manage for mountain pine beetle (both attacked and susceptible stands) in areas that have competing (and sometimes mutually exclusive) higher-level plan objectives, including visuals, water, fish, and biodiversity, and how best to prioritize when all of the stated objectives for the array of values are impossible to meet (by providing case studies, examples, best management practices, etc.). I'd also like to see forest practitioners meet (working groups, conferences) with forest researchers to identify knowledge gaps at the operational level and how to address them.*
- *Research institutions should form clusters and pool their extension efforts to put the actual information providers in closer contact with users.*
- *British Columbia is so large and biogeoclimatologically diverse that meaningful extension requires a high level of local expertise. It may be best achieved by identifying local experts whose position allows them to share with all stakeholders and arrange for them to make at least 5–10 workshops per year in their region, and also to operate a web site that supports the local scene. It seems to be a waste to have generic material, no matter how good it is, from say Kamloops on the core site that serves Prince Rupert.*
- *More personal small-group contact by FORREX personnel.*
- *Work more closely with other provincial and federal agencies, which also provide extension services, so that duplication does not happen and co-operation does.*
- *The continual promotion of web-based information to gain interest from professionals should [be] the main step, then once interest is shown plan future workshops on those specific topics that could fall in the user-pay scenario.*
- *Professional associations need to be better involved in extension services. Extension work needs to include risk management principles. Extension "services" need to be resilient to policy change.*
- *Don't try to be all things to all people.* ***Focus*** *on a few key elements, and do them well.*
- *Keep it simple.*
- *For forestry extension to be successful, government agencies must truly buy into it (i.e., be science-based in their decision making and open to innovation; not adverse to risk taking). If the government agencies continue in their desire to be merely regulators (i.e., maintainers of the status quo), then science-based innovations will not occur.*
- *Due to money and time constraints and downsizing, I no longer have the time to keep abreast of new ideas. Due to family obligations, I will not keep abreast on my "own" time. Sad situation—I do not see the end in sight. Make it short, focussed, and applicable within current regulations. I cannot spend time on nice-to-do's that are outside regulations.*

Directory: One-stop Shopping for Sources of Research

- *An easily searchable database of who is doing what research and where (within British Columbia) would help track down the current relevant research and the folks carrying [it] out.*
- *A periodic listing of recent research (completed or ongoing), organized by broad topic, and mailed or e-mailed to interested parties would be very useful.*
- *Lists of newly published research: information on newly started or in-progress research. For both of these, through e-mail lists to individuals, when received, one can review if there is anything of interest to them at that particular time. This information should be updated on a web site as new information becomes available.*
- *An organized one-stop repository of all aspects of the sciences related to the development of the land-based forest sector is crucial. Then training is required so this information can be disseminated.*
- *Centralized directory for research information, notification of where this information is available, and what information is available.*
- *Monthly e-newsletter with a summary of all the current research being conducted and sources of information for specific topics. Without such a resource, it is often impossible to keep current about what is happening and who one might contact.*
- *Single (or very few) web site to list, link, or provide forestry and ecology research information applicable to or done in British Columbia.*

Evaluation of Existing Forestry Extension Services

- *Keep up the good work.*
- *FORREX is invaluable because it is a collaborative effort among industry, academics, government, and volunteer organizations. The staff are very professional and helpful. I would like to see that FORREX's future is assured.*
- *Keep the professional services continually expanding and improving. This is a vital link for professionals and helps a big bunch with our credibility with peers, public, and industry. If we don't use it, we'll lose it. This is a critical communication link for us all. Thanks for the hard work to fight to continue the service and to improve it.*
- *Individuals within FORREX are the strength of the organization.*
- *FORREX is the one organization that gives those on the periphery a chance to stay in contact with science. Thanks to you at FORREX, you do great work.*
- *Through necessity, the future of forestry extension in British Columbia must be bright. We currently work in a complex decision-making environment that will only become more complex. Accordingly, the need for a large, effective, and responsive extension environment will only become more critical.*
- *The future of forestry extension does not seem very bright. The transition to "science-based management" has been abrupt for government and industry foresters and it will take time and greater dialogue to ensure success.*
- *Forestry extension in the province is a vital resource. FORREX provides a great foundation for this resource; however, I believe their current impact in forest extension in the province is lacking. This lack of effectiveness is not reflective of quality of staff or the work they do, but perhaps their ability to adequately distribute information given their current workloads and staffing levels (that I realize is most likely constrained by financial resources). I believe it requires a much larger infrastructure to provide extension to the*

extent that FORREX has [been] made responsible. In order to provide really effective and technically useable extension services, I believe the FORREX team would greatly need to be expanded. I appreciate the work FORREX has done to date, and hope the provincial extension agency can continue to provide such service to a more expanded extent in the future, thus allowing their maximum effectiveness to be reached.

- *Would be nice to have excellent writers available for help with writing extension notes and publications.*
- *Good to see that it is still "alive."*
- *FORREX covers a lot of ground and a lot of interest areas. Until there is a sufficient body of knowledge in enough areas of interest, FORREX will not be where people go to for information. Until FORREX has that profile, it will remain underutilized in favour of knowledge sources that are more focussed and well known. Forestry extension is a needed service, but it needs mass and momentum to become the go-to source.*
- *Extension is very important and should be continued and enhanced. Extension should be multi-directional—between practitioners, researchers, policy-makers, public, etc. Extension should be neutral and not reflect the culture of the largest players.*
- *FORREX has been going down the right path so far. The services provided have greatly improved the extension of research, in comparison to what occurred when the government handled it. FORREX is now a necessary entity, especially given government cutbacks and corporate cutbacks. No one else fills the niche. They also have a real role to play in the continuing education game.*

Importance of Extension

- *Forestry extension services will be even more important in the future because the world is always becoming more complicated and there's more information being generated.*
- *Changes in forest policy in British Columbia and the inclusion of First Nations and community forests will be successful only with the correct scientific information to help guide proper forest management decisions. I believe these extension services can have a significant impact.*
- *Forestry extension is critical now and will only increase in importance in the coming years. Cost-sharing and partnership development will be required to accomplish this.*
- *Extension services are critical to maintaining the expertise in this ongoing period of change, to provide new information and to provide avenues for training in emerging knowledge and continually evolving legislative frameworks. A strong extension community is able to provide services such as training in new legislation in a more cohesive manner than expecting government or industry professionals to pick up the detail management and teaching skills required.*
- *Extension is essential now and in the future.*
- *There must be a link between the researcher and the practitioner. The researcher needs to know what the practitioner wants to know so that research can be applied and relevant.*
- *Extension (for science-based information) has been highly underrated in the past 10 years or so. There is a great need to educate government staff (and probably others) on how to provide extension for their work—regional*

training workshops probably work the best. Some people would do well with web-based training, but the folks who need it most (not good communicators) may not benefit as much; they would need more hands-on training.

- *British Columbia too often views publication of reports as adequate extension. Many previous programs (Forest Resource Development Agreements I and II [FRDA], Forest Renewal BC), as well as current initiatives (Forest Investment Account [FIA]/Forestry Innovation Investment [FII]), omit hands-on extension as a component of successful delivery of a project. Not enough time or resources to do literature searches, read journals, or lengthy reports, perform Internet searches of web sites, etc., to ensure they are current. Probably a few days a year to attend workshops, or a few hours every couple of weeks to catch up on some reading with a very well summarized/focussed extension note.*
- *Extension will continue to become an increasingly important tool. The current mountain pine beetle epidemic is a case in point. The accountability spotlight is being directed at forest managers, and the intensity will continue to increase alongside the epidemic. Solutions or mitigative measures will be demanded and we need to be armed to implement the latest information. In order to remain effective and relevant an extension organization must have:*
  - *well-defined and achievable goals*
  - *well-defined and communicated application of results*
  - *well-defined and communicated benefits stemming from the application of the results*
  - *full participation or collaboration of those involved or impacted*

Target Audience

- *The forestry extension need is twofold: (1) The general public, who own 95% of our land base, require educating regarding forestry diligence in this province; (2) Forestry field practitioners require field and workshop exposure to stay abreast of field-applicable research as well as current "best management practices."*
- *Don't neglect the northeast.*
- *Do a better job of getting information out to the public (e.g., get more information on the pine beetle and how to control it out to the public).*
- *More extension courses in the Southern Interior – Kootenay region.*
- *Target resource professionals at the mid-career level. In many cases, most training is at an introductory level.*
- *Need to ensure that outreach is equitable, not just where the next publication or next funding source lies.*
- *Our company uses local consultants to lay-out and engineer harvesting. It is difficult for these consultants to keep up-to-date on the latest innovations. This is due to the cost of sending personnel to courses or workshops. These need to be subsidized and a spectrum of services offered, such as newsletters and journals. It would be nice if there was some kind of financial or tax incentive for consultants to send employees for training.*
- *In order to get some real change in resource management, people need to develop a sense of themselves as part of the natural world. This is much more easily done when they are children. Schools must let kids outside in nature much more often (since it doesn't seem to be happening at home). I realize that FORREX does not focus on early childhood education, but the earlier, the*

better (e.g., see a book entitled Last Child in the Woods by Richard Louv; www.thefuturesedge.com).

- Two key issues that drive most of extension currently: First and foremost, cost. You must be competitive with other extension service providers. There are about 17 831 other information sources available and you must be in the cost running. To gain credibility you have to get into their arena and jurisdiction. This may mean failing occasionally but, that is OK. Over time, you will get their attention.
- The Forest and Range Practices Act allows a fair amount of flexibility for licensees to create results or strategies to meet provincial objectives. Continuing competition amongst licensees to deliver lower and lower cost wood also fuels the need for innovation. As a result, individuals who prepare Forest Stewardship Plans and front-line operational forestry staff (both professionals and technologists) will be the target audience for extension. Close behind in priority would be mid-level managers responsible for overall programs or those supervising front-line staff.

Topics

- You must shoot for operations/on-the-ground stuff. Your current focus on the social/environmental requests makes you "off target" for most decision makers these days.
- Eco-based focus rather than harvesting focus.
- Thresholds as an alternate way to define sustainability with respect to non-timber values in a climate of large-scale disturbance and amendments or opportunities to change antiquated salvaging policies.
- TV spots telling the truth about the state of our forests. Maps showing the changes in British Columbia forests over time in composition, biomass, species, etc.
- More information on non-forestry–related values and how to incorporate them into forestry planning and operations. Specifically, how to get forestry professionals and corporations to buy into innovative methods and take chances with their operations in an adaptive management style rather than expecting adaptive management from organizations with an interest in non-timber values.
- A key element of Forest and Range Practices Act is the role that the non-legal realm, based on science and experience, will play. Getting information out to practicing foresters outside and inside of government is critical. The key is to identify which areas of forestry licensees will most likely want to innovate in (riparian and stream protection for example). Other sustainability issues will, however, also become evident through Forest Service Effectiveness monitoring. Use of high-retention silvicultural systems and associated stocking standards is one such example.
- Examples of economically viable, ecosystem-based forestry, if there are any. If not, then what are the pieces that need to be in place to make this happen. A roadmap (including pitfalls) to this would be helpful for communities.
- More operational focus on critical issues such as the mountain pine beetle problem and how this relates to maintenance of biodiversity and other non-timber resource values. I think there should be more emphasis placed on the operational and policy aspects of natural resource management.
- Conferences, publications, and extension services that are directed to the application of science-based management.

- *Forestry extension should be about monitoring current research and then "translating" it to an operational level and delivering it to practitioners. They should also monitor research needs and act as a liaison to ensure that these needs are met.*
- *More information on biodiversity and related topics (e.g., invasive species). Getting good scientific information to land users should be a priority. One huge missing link is what are the economic benefits to conservation. We know that not cutting some timber has an economic cost to an industry, but what is the positive economic benefit of leaving those trees there. This is not well outlined yet and most work on the subject points to this being a huge issue; that is, there is a huge economic benefit to conservation (e.g., ecosystem services, see mangrove issue in SE Asia after tsunami). Too much emphasis on forestry practices in* FORREX*—get more into facilitating proper conservation.*
- *Broader coverage to communities and other organizations whose members are making natural resource decisions. Follow-up to catastrophic events (i.e., keep the knowledge flowing after the fire is out).*
- *Extension that relates to the specific problems licensees face in terms of legislative changes as well as operations, delivered by practitioners, would be worthy effort.*
- *Ecosystem-based forestry with the use of Predictive Ecosystem Mapping ensuring that biodiversity is maintained within each biogeoclimatic unit. I believe that going to the larger Natural Disturbance Units will result in less biodiversity.*
- *The most critical issue in British Columbia today is the economics of forestry. The environmental side is well under control and requires less additional research. The focus should be on how to do things more cost-effectively so we can compete in the global market. A big focus should be on the fact that stumpage has increased to the point that companies no longer can make a reasonable profit. This is resulting in chaos in the forest industry with companies selling out and no money left to invest in the industry. The government, or the people of British Columbia, are taking too large a share upfront out of the industry through increased stumpage. Research should examine this trend and look at the importance of other benefits of the forest industry, such as employment and community stability. The latter may all be lost if the forest industry is not allowed to make a fair return on the risk of their investment. If profitability is not returned to the industry, we will lose the potential of B.C. forests for the people of British Columbia.*
- *A lot of work needs to be done on forestry roads and bridges engineering and science.*
- ***Integrating** the social, economic, and ecological factors related to forests, **not** trade-offs—that's old-school thinking. (There's a saying ... thinking and doing things the same way produces the same results.) We need* FORREX *to foster the new thinking and doing, and then deliver that knowledge into the hands of those who are the doers.*
- *The development of tools to establish suitable indicators, thresholds (at suitably operational scale), and monitoring protocols is key. The use of adaptive management as a tool to function in the absence of complete information is also poorly utilized in the province. If adaptive management principles could be applied to muster change to policies and practices, that would be awesome.*
- *Promoting an increased focus on non-timber resource values (i.e., more equal weighting of non-economic/intrinsic values in decision making), pro-*

moting accountability in decision making by forest professionals, and further research into policy/practice options for managing road access (including investigating revenue options such as dedication of a portion of stumpage to road deactivation). Increased co-ordination of biodiversity monitoring between agencies is critical—FORREX could play an important role in assisting such co-ordination.

- *More silvicultural information.*
- *Involve the entire forest products manufacturing chain. Too much emphasis is placed on non-economic values.*
- *Increased focus on ecosystem–product relations. Increased attention to social demands. Improved understanding of climate impacts.*
- *See water as the most important forestry product and quit commercial harvest of wood.*
- *I liked seeing that FORREX may start up the Small Woodlands web site. I produced information for that program that never got on the site; it should if site is updated. Some of the information may need updating. Information needs to available to the private landowner besides professionals. Therefore, there is need for either a separate web site or *marked as "useful for landowners" on an index. The Private Forest Landowners Association (PFLA) has provided extension about regulations, but so far has not been able to provide general extension information for landowners. There are a lot of sources for information; a list of these sources and what they have would help.*
- *Considering the impact of the pine beetle in the province, there should be a focus on how to assist the single-resource towns to survive economically after the 5-year window has passed and the pine trees are gone. Silviculture? Should FORREX become involved in lobbying the federal government to put dollars into reforestation, a program similar to FRDA?*
- *There will continue to be a desperate need for expertise in developing and implementing processes for bringing together strategic forestry planning with socio-economic analyses, biodiversity planning, and protection of species at risk. Long-term monitoring of the impacts of forestry on biodiversity is completely lacking in British Columbia. We are conducting a huge "adaptive management" experiment with our province, without the requisite monitoring and feedback to determine if our operations are consistent with sustainability and maintenance of biodiversity and natural processes. All planning processes get thrown out the window to chase bugs and (or) for political expediency to appease First Nations that (understandably) want to benefit economically from resource utilization on their traditional territories. Industry should be shouldering a far higher percentage of costs associated with extension services—it should be an accepted cost of making billions from a public resource.*
- *Two issues will be critical to extension in the future: community involvement and the role of Indigenous peoples' knowledge (IPK) in the decision-making processes in the province. For too long now, government and industry have been taking from the community's sustainable future and the community will be demanding their fair stake in natural resource management returns. The role of IPK as a planning and management tool has only received lip service to date by government and industry. The recognition of these two sectors and how the constituents of each will be honoured will be a critical factor in determining how sustainable forest management will be achieved in the future. Extension must play an important role in making their inclusion a reality.*
- *More information on biodiversity, its importance to sustainable forestry, and*

the need for maintenance of control areas (i.e., protected areas), and less information on industrial forestry.

- *With climate change becoming very real, more research on its effects on land and ecosystems, and the implications for forestry and resource extraction. This should result in better planning for habitat protection. Industry, jobs, and large-scale economics have been the deciding factor for government decisions for more times than not, and we are now seeing the diminishing effects on wildlife and resources. I believe forest extension needs to incorporate more research into innovative forest, land, and resource management practices that provide more balance in favour of the environment. Forest extension and science seem to favour the working or supporting industry more so than influencing better management practices.*
- *In order to sell future forestry extension in British Columbia, education of the public is essential. This will be accomplished by bringing public involvement groups into the discussion and allowing these groups to act as a liaison between the public and the agencies promoting forestry extension in the province.*
- *Focus on building capacity in areas that are new or upcoming. Provide learning and extension to get the information to those who would normally have trouble accessing the information. Less new or active emphasis on getting information to those that already know how to find it. Having said that you must continue to provide the service as the repository of research and other materials.*
- *More information directed to the First Nations communities.*
- *Increased involvement in species-at-risk recovery teams.*
- *When discussing trade-offs related to the pillars of sustainability, we all will continue to struggle with creating or identifying the appropriate regime. In Canada, the concept of societal will or public interest is meant to lead or assist the directing of how sustainable forest and land management is achieved. A goal of extension should be to contrast the perceived public interest in presentation format (those interpreting are governments, representatives of the public, industry, professionals, researchers) to exhibit the expected results over the long term. This is suggested because often the image portrayed is the 5-year plan, the 20-year management plan, and what the economic sustainability is related to the timber resources. Biological diversity and its maintenance and enhancement using sound principles of conservation management should continue to be sought, tested, and applied. Canadians have a partner that continues to be underutilized due, in part, to the unfortunate lack of social cohesion between Aboriginal/First Nations Governments and the two orders of the Crown. The gap in social needs and contemporary interests continues to grow while policies continue to be written that are meant to intervene and favour improved relations and benefit-sharing from the use of the land. Extension should be seen as a method of continuing to grow and support First Nations institutions that can lead to improved social cohesion.*
- *Need to integrate extension from forestry, range, and private land holdings.*
- *First Nations have title to the lands; therefore, the focus should be giving them governing powers to be involved.*

APPENDIX 8 Cluster Analysis

Cluster analysis is an exploratory statistical technique that is used to find natural groupings of respondents so that each respondent in a group is similar to the others in the same group with respect to one or more key characteristics. The purpose of this type of analysis is to determine whether any findings may not have been revealed through other analyses. Respondents are grouped based on their responses to one or more variables. In this cluster analysis, extension products offered by FORREX were used as the grouping variables. The new clusters (groups) identified through the clustering process were cross-tabulated with other survey results to characterize respondents in each cluster. The cluster analysis allowed for an examination of similarities and differences between respondents based on their perceptions of the helpfulness of extension delivery methods used by FORREX.

A k-means (partitional) cluster analysis (Aldenderfer and Blashfield 1984) revealed two disjoint groups: one group of respondents considered the FORREX information sources "more helpful" ("cluster 1") and one considered them "less helpful" ("cluster 2"). Table A8.1 shows the statistical cluster centres (i.e., mean score) for each information source, as well as the average centre for each cluster. The difference between cluster centres shows which information sources contributed the most in differentiating the clusters. Respondents from each cluster demonstrated greater disagreement about the usefulness of "list serves," "non-governmental organization technical specialists," and "web-based self-directed learning and training modules" as information sources. In general, respondents from both clusters agreed that "co-workers in your organization," "professional journals and publications," and "Internet" are very helpful information sources. Thus, these variables contributed the least in separating the clusters.

TABLE A8.1 *Final cluster centres used in cluster analysis*

Information source	Cluster 1	Cluster 2	Difference between cluster centres
List serves	2.0	3.3	1.3
Non-government organizations	1.8	3.0	1.1
Web-based self-directed learning and training modules	2.1	3.2	1.1
NRIN (Natural Resource Information Network)	2.2	3.1	0.9
College or university researchers	1.6	2.5	0.9
Government researchers	1.5	2.2	0.8
Private consultants/contractors	1.6	2.4	0.8
Extension specialists	1.8	2.5	0.7
Agency report/guidelines	1.7	2.3	0.6
Government technical specialists	1.6	2.1	0.6
Extension notes	1.8	2.3	0.6
Newletters	1.9	2.5	0.5
Libraries	1.8	2.2	0.5
Internet	1.4	1.7	0.3
Professional journals/publications	1.6	1.9	0.3
Co-workers in your organization	1.4	1.6	0.3
Mean	**1.7**	**2.4**	

About 50% of the respondents in both clusters were between 46 and 55 years old; cluster 1 had a higher proportion of younger respondents (Table A8.2). On the other hand, cluster 1 had a lower proportion of respondents who were between 36 and 45 years old.

TABLE A8.2 *Proportion of each age range within clusters (survey question 23)*

	Age ranges (years)			
	< 35 (%)	36–45 (%)	46–55 (%)	55+ (%)
Cluster 1 (Respondents who found FORREX information sources "more helpful" (n = 194)	11	24	51	14
Cluster 2 (Respondents who found FORREX information sources "less helpful" (n = 109)	5	31	48	16

Close to one-third of the respondents in both clusters did the majority of their work in the Southern Interior of British Columbia (Table A8.3). Compared to cluster 2, cluster 1 had a larger proportion of respondents who did the majority of their work in Victoria and in the province's Northern Interior; however, cluster 2 had a larger proportion of respondents who did the majority of their work outside of the province.

TABLE A8.3 *Proportion of respondents from each region within clusters (survey question 25)*

	Region				
	Southwest or coastal British Columbia (other than Victoria) (%)	Victoria (%)	Northern Interior (%)	Southern Interior (%)	Outside British Columbia (%)
Cluster 1 (n = 192)	24	13	20	34	9
Cluster 2 (n = 107)	27	9	15	35	14

Cluster 1 had a lower proportion of government operations respondents (Table A8.4). This cluster also had a slightly higher proportion of respondents from the government researchers and First Nations–affiliated organizations groups. Cluster 2 had a slightly higher proportion of respondents affiliated with the NGO–policy consultants group than did cluster 1.

Forty-three percent of respondents in cluster 1 and 36% of respondents in cluster 2 indicated that it is "much more" important to have a provincial extension service now when compared to 10 years ago (Table A8.5). In contrast, a larger proportion of respondents in cluster 2 indicated that it is "equally as important" to have a provincial extension service today as it was 10 years ago.

TABLE A8.4 *Proportion of each respondent group within clusters*

	Respondent groups						
	Industry (%)	Operations: Government (%)	RNGUC (%)	Research: Government (%)	Policy (%)	NGO- Policy Consultants (%)	First Nations Organizations (%)
Cluster 1 (n = 197)	26	23	16	11	11	9	5
Cluster 2 (n = 110)	25	27	16	9	10	11	3

TABLE A8.5 *Proportion of respondents in each cluster regarding importance of extension services (survey question 1)*

	Respondent groups					
	Much more important (%)	Somewhat more important (%)	Equally as important (%)	Somewhat less important (%)	Much less important (%)	Not sure (%)
Cluster 1 (n = 197)	43	24	30	1	0	2
Cluster 2 (n = 110)	36	24	33	2	3	3

Sixty percent of respondents in cluster 1 and 53% of respondents in cluster 2 devoted 1–25% of their time in the provision of information to other natural resource–related personnel (Table A8.6); however, cluster 2 had a larger proportion of respondents who spent 26–75% and more than 75% of their time in the provision of information to other personnel.

TABLE A8.6 *Proportion of respondents in each cluster regarding time devoted to providing information to other natural resource–related personnel (survey question 24)*

	None (%)	Between 1–25% (%)	Between 26–75% (%)	More than 75% (%)
Cluster 1 (n = 189)	3	60	28	9
Cluster 2 (n = 107)	4	53	31	12

Respondents were asked to select the most critical topics for forestry extension in British Columbia. Table A8.7 shows the proportion of respondents in each cluster who selected each of the topics. In the area of ecosystem-based management and biodiversity, for example, 24% of cluster 2 respondents considered the topic "invasive species" (survey question 7d) as among the most critical in British Columbia, compared to 22% of cluster 1 respondents. The main topics selected by the respondents in cluster 1 were:

- "assessing, managing, monitoring, and evaluating biodiversity" (56%), and
- "improved inventories for ecological values" (41%).

TABLE A8.7 *Proportion of respondents in each cluster who consider the listed topics as being among the most critical in British Columbia (survey questions 7–11)*

	Cluster 1 (n = 197) (%)	Cluster 2 (n = 110) (%)
Ecosystem-based Management and Biodiversity		
a. Assessing, managing, monitoring, and evaluating biodiversity	56	44
b. Contribution of protected areas and non-harvestable land base to maintenance of biodiversity	37	33
c. Natural disturbance patterns and implications for forest management and restoration	38	38
d. Invasive species	22	24
e. Habitat requirements for species at risk	38	44
f. Ecological restoration: techniques and requirements	23	21
g. Impacts of range management on biodiversity	21	16
h. Improved inventory for ecological values	41	29
Socio-economics		
a. Incorporating social and economic indicators into planning, operations, and policy	46	52
b. Valuing non-timber values for inclusion in operations, planning, and policy	56	51
c. Social trends and values	29	25
d. Public participation processes	22	25
Watershed Processes and Management		
a. Forest management impacts on water quality or quantity	46	54
b. Range management impacts on water quality or quantity	28	23
c. Pest and fire impacts on water quality and quantity	31	22
d. Stream geomorphology	9	20
e. Hillside geomorphology and soils	13	14
f. Forest engineering (e.g., roads and stream crossings)	14	22
g. Riparian management	38	35
h. Hydrologic recovery and silviculture systems	35	35
Forest Operations and Planning		
a. Sustainable forest management planning	58	51
b. Silvicultural options	24	22
c. Vegetation management	8	17
d. Growth and yield predictions	19	21
e. Pest management	27	25
f. Harvesting technologies	14	21
g. Impacts of large-scale salvage	35	32
h. Soil productivity and conservation	25	24
i. Non-timber forest products	34	22
j. Monitoring procedures	35	32
k. Utilization	17	15
General		
a. Trade-offs between social, economic, and ecological indicators	61	57
b. Climate change impacts on forests and water	53	44
c. Incorporation of indigenous and experimental knowledge into management	31	28
d. Extension methods	10	11

Respondents in cluster 2 gave equal importance to "assessing, managing, monitoring, and evaluating biodiversity" and "habitat requirements for species at risk" with 44% of respondents selecting each of these topics.

For the socio-economic topics, "valuing non-timber economic values for inclusion in operations, planning, and policy" was selected as the most critical topic by 56% of respondents in cluster 1. The top two selections for respondents in cluster 2 were "valuing non-timber economic values for inclusion in operations, planning, and policy" (52%) and "incorporating social and economic indicators into planning, operations, and policy" (51%).

For the watershed processes and management topics, "forest management impacts on water quality and quantity" was selected as the most critical topic in both clusters; however, a higher proportion of cluster 2 respondents (54%) selected this topic than did cluster 1 respondents (46%).

Approximately one-half of the respondents in each cluster (58% in cluster 1 and 51% in cluster 2) indicated that "sustainable forest management planning" was the most critical amongst the forest operations and planning topics. Cluster 1 respondents (34%) considered "non-timber forest products" a more critical topic than did cluster 2 respondents (22%). On the other hand, 17% of cluster 2 respondents selected "vegetation management" as a critical topic compared to 8% of cluster 1 respondents.

For the four general topics, respondents in both clusters selected "trade-offs between social, economic, and ecological indicators" and "climate change impacts on forests and water" as the most critical topics in British Columbia; however, those in cluster 1 selected these two topics with proportionally higher frequencies (61% and 57%, respectively) than did those in cluster 2 (57% and 44%, respectively).

Overall, respondents in cluster 1 indicated that the 16 information sources described in survey question 6 were between "very helpful" and "somewhat helpful" (mean cluster centre of 1.7); in cluster 2, these information sources were between "somewhat helpful" and "somewhat unhelpful" (mean cluster centre of 2.4). It appears that the further apart the average cluster centres are, the more distinct the respondents in each cluster. Cluster 1 is larger than cluster 2, containing 64% of the respondents who answered that question. A number of characteristics may differentiate the two clusters depending on the heterogeneity between and homogeneity within clusters.

In summary, when survey respondents were clustered into two groups (those who believed that FORREX products and services were generally "more helpful" and those who believed that they were "less helpful"), this analysis revealed that:

- A higher percentage of respondents in the 46- to 55-year age category believed that FORREX products and services were more helpful than those who considered these products and services less helpful. A higher percentage of those under the ages of 45 and over 55 thought that FORREX products were less helpful.
- A higher percentage of respondents from Victoria and northern British Columbia believed that FORREX products and services were more helpful than those who considered these products and services less helpful. A higher percentage of respondents from other regions thought that FORREX products were less helpful.
- Very little differentiation exists between the seven respondent groups in terms of those who generally believed that FORREX products and services

were more helpful and those who considered these products and services less helpful.

- More of those who generally believed that FORREX products and services were more helpful also tended to think that extension services were more important than 10 years ago.
- More of those who believed that FORREX products and services were more helpful spent 1–25% of their time as information providers. Fewer of those who spent more than 75% of their time as information providers believed that FORREX products and services were more helpful than those who did not.